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ABSTRACT

Forty-four papers presented at a conference focusing on research in agricultural education are presented in this document. Representative titles among the papers (each of which is followed by a brief critique) are: "Analysis of the Computer Anxiety Levels of Vocational Agriculture Teachers" (Kotrlik, Smith); "Assessing Performance and Planning Inservice Needs of First-Year Vocational Agriculture Teachers" (Barrick, Doerfert); "Assessment of the Preparation and Career Patterns of Agricultural Education Graduates, 1975-1987" (McGhee, Cheek); "Beliefs and Intentions of Counselors, Parents and Students Regarding Agriculture as a Career Choice" (Thompson, Russell); "Cognitive, Perceptual, and Instructional Preferences of Agricultural Education Students" (Rollins, Scanlon); "College Curriculum Competencies and Skills Needed by Agricultural Education Majors" (Deeds, Hash); "Comparison of the Academic Preparation and Performance in College of Agricultural Education Majors and Other Agricultural Majors" (Raven, Warmbrod); "Comparison of Perceptions of Secondary Agriculture Teachers, Superintendents, Principals, and School Board Presidents on Barriers which May Impede Change in Secondary Agriculture Education Programs" (Dillon); "Ethnographic Approach to Assessing Excellence in Agricultural Education" (Wardlow et al.); "Exemplary Secondary Agricultural Education Programs" (Migler et al.); "High School Agriculture Program Completers and Their Success in College" (Riesenberg, Lancaster); "High School Students' Perceptions of Agriculture and Careers in Agriculture" (Orthel et al.); "Identification of Teaching Techniques, Strategies and Styles for Use with Special Needs Students Enrolled in Vocational Agriculture" (Conroy, Baggett); "The Induction Year" (Mundt); "Instructional Approaches Used by Extension Agents, Adult Instructors, and Secondary Teachers to Teach Farmers" (Bouare, Bowen); "Interaction of Secondary Agriculture Teacher Health and the School as a Workplace" (Westrom, Lee); "Learning Blocks that Reduce Agricultural Student Achievement" and "Learning Strategies that Agricultural Students Use Successfully and Unsuccessfully" (Barrett, Zamani); "Mentor Teachers' Perceptions of the Mentoring Experience"

(Simon); "Mentoring: Is It an Effective Orientation Procedure?"
(Clark, Zimmer); "Relationship between Mentoring and Career
Development of Agricultural Education Faculty" (Eastman, Williams);
"Science-Related Objectives Taught in the Advanced Program of
Vocational Agriculture in Louisiana" (Moss); "Student and Parent
Images of Vocational Education Offerings" (Rossetti); "Using Selected
Academic Variables to Predict Student Performance on the National
Teacher Examinations" (Jewell); "Validation of Research Priorities
for Adult Education in the North Central Region" (Birkenholz et al.);
and "Making a 'Mess' of Research in Agricultural Education" (Miller).
(KC)

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NATIONAL

PROCEEDINGS OF THE
SIXTEENTH ANNUAL

AGRICULTURAL

EDUCATION

RESEARCH

MEETING



ORLANDO

DECEMBER 1, 1989

BRIDGING THE GAP:

RESEARCH OF THE 80'S --- NEEDS OF THE 90'S

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**RESEARCH IN AGRICULTURAL EDUCATION
BRIDGING THE GAP:
RESEARCH OF THE 80'S – NEEDS OF THE 90'S**

Proceedings

Compiled and Edited

by

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Sixteenth Annual National
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December 1, 1989

Orlando, Florida

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Preface

The National Agricultural Education Research Meeting (NAERM) is a national forum focusing on research in the field of Agricultural Education. The NAERM is held annually in conjunction with the American Vocational Association Convention. Since its first meeting in 1974, the number of paper submissions, research presentations, and attendees has increased.

This year's program has involved individuals from more than 30 states. A total of 130 papers were submitted for consideration for presentation at this sixteenth meeting. This number represents more than a 30% increase over last year's submissions. Each paper was reviewed and evaluated by four members of the profession. Using the ratings assigned by these reviewers, the top 36 papers were accepted for presentation at the conference. This represents a 27.7% acceptance rate. In addition, another seven papers were accepted for publication in the proceedings. When these additional papers were included, the acceptance rate was 33.1%.

Three criteria were established a priori for use in making decisions regarding acceptance of papers. These criteria included: (1) recommended for acceptance by three of the four reviewers; (2) overall ranking of the paper based on the total weighted score calculated from the reviewers' ratings; and (3) ranking of the paper within those papers evaluated by each group of reviewers. Any research report which met two of these three criteria was accepted for presentation.

The purposes of the NAERM were delineated by Al Mannebach in his preface to the 1987 NAERM Proceedings. The purposes were well stated by Dr. Mannebach and are worthy of being printed again. They included:

1. To present and disseminate the most recent and best research on the national level as judged by referees.
2. To present and disseminate critiques of the research by researchers in the profession.
3. To provide a forum for discussion of methodology and results.
4. To provide feedback to authors regarding research procedures and methodology used.
5. To provide suggestions to authors for preparing manuscripts for publication.
6. To give novice researchers an overview of current research issues, methodology, and critique within the profession.
7. To improve the quality of research conducted in future years.
8. To identify and recognize the Outstanding Paper Presentation at the National Agricultural Education Research Meeting on an annual basis.
9. To provide a written record of quality research completed and professional critique over time.
10. To broaden horizons and chart new directions for the conduct of agricultural education research in the future.

The expectation of quality for the 1989 NAERM was established by those who chaired previous meeting. The 1989 NAERM is the sixteenth meeting in a series of distinguished meeting. Previous meetings and their respective chairpersons were:

PREVIOUS MEETINGS AND CHAIRPERSONS

- 1 1974 New Orleans, LA Hollie Thomas, Florida State University
- 2 1975 Anaheim, CA Hollie Thomas, Florida State University
- 3 1976 Houston, TX Glen Shinn, Mississippi State University
- 4 1977 Atlantic City, NJ William Richardson, Purdue University
- 5 1978 Dallas, TX Bennie Byler, Mississippi State University
- 6 1979 Anaheim, CA Ronald Brown, Mississippi State University
- 7 1980 New Orleans, LA L.H. Newcomb, The Ohio State University
- 8 1981 Atlanta, GA Maynard Iverson, N. Carolina State University
- 9 1982 St. Louis, MO Dale Oliver, Virginia Tech State University
- 10 1983 Anaheim, CA Paul R. Vaughn, New Mexico State University
- 11 1984 New Orleans, LA Jimmy G. Cheek, University of Florida
- 12 1985 Atlanta, GA Bob Stewart, University of Missouri
- 13 1986 Dallas, TX Alan A. Kahler, Iowa State University
- 14 1987 Las Vegas, NV Alfred J. Mannebach, University of Connecticut
- 15 1988 St. Louis, MO Edgar P. Yoder, The Pennsylvania State University

I hope that the proceedings of the 1989 NAERM will be useful to all who receive them. I also hope that all presenters will submit their work for possible publication in a professional journal. It is time to begin preparing for the 1990 NAERM. Please submit paper proposals for consideration to Robert A. Martin, Iowa State University. Any comments you may have about this year's procedures or suggestions for improvement of future meetings will be appreciated.

Michael F. Burnett, Chairperson
1989 National Agricultural Education Research Meeting

ACKNOWLEDGMENTS

An undertaking of the magnitude of this meeting required the involvement, cooperation, and assistance of many people. I want to acknowledge my sincere thanks to a number of individuals who helped make this meeting successful: to Al Mannebach, 1987 NAERM Chairperson, who eagerly provided information and materials when called on; to Jeff Moss, Chairperson, Research Committee, Agricultural Education Division, American Vocational Association and to Research Committee members for sponsoring and assisting in conducting the meeting; to George Busby, Program Chairperson, Agricultural Education Division, American Vocational Association, who made many arrangements and coordinated the overall program planning effort; to James W. Trott, Director, School of Vocational Education, Louisiana State University for providing the needed administrative support for the successful completion of this meeting; to Mrs. Sharon Hutchinson and Mrs. Catherine Mitchell for providing secretarial support; to all the participants in the program—reviewers, chairpersons, facilitators, discussants, presenters, outstanding paper presentation evaluators, and registration workers—whose efforts resulted in an excellent conference; and to all members of the profession who submitted research paper proposals and permitted their work to be judged by their peers. In addition, a very special acknowledgement is due to Mrs. Sandra Cash, Secretary, School of Vocational Education, Louisiana State University, without whose diligent and untiring efforts, the preparations for this conference could not possibly have been completed in a timely fashion.

A special "thank you" is due to the following Agricultural Education professionals who served as reviewers and whose work provided the basis for the objective selection of papers to be presented.

Reviewers

- ° Larry Arrington, University of Florida
- ° R. Kirby Barrick, The Ohio State University
- ° Carl Beeman, University of Florida
- ° Arthur L. Berkey, Cornell University
- ° Bob Birkenholz, University of Missouri-Columbia
- ° Lloyd Blanton, Clemson University
- ° Blannie E. Bowen, The Pennsylvania State University
- ° Gary Briers, Texas A&M University
- ° Ronald A. Brown, Mississippi State University
- ° Richard Carter, Iowa State University
- ° Jimmy Cheek, University of Florida
- ° John Crunkilton, Virginia Tech
- ° James E. Christiansen, Texas A & M University
- ° Jacquelyn Deeds, Mississippi State University
- ° Eddy Finley, Oklahoma State University
- ° Jim Flowers, North Carolina State University
- ° Rick Foster, University of Nebraska

- ° Julia Gamon, Iowa State University
- ° Stacy Gartin, West Virginia University
- ° Tom Grady, University of Wisconsin-Madison
- ° Jan Henderson, The Ohio State University
- ° Joe G. Harper, University of Nevada-Reno
- ° Ray Herren, University of Georgia
- ° John Hillison, Virginia Tech
- ° Maynard Iverson, University of Georgia
- ° Jim Key, Oklahoma State University
- ° Barbara Malpiedi Kirby, North Carolina State University
- ° Joe Kotrlik, Louisiana State University
- ° David E. Lawver, Texas Tech University
- ° Gary Leske, University of Minnesota
- ° J. David McCracken, The Ohio State University
- ° Alfred J. Mannebach, University of Connecticut
- ° Glen Miller, University of Arizona
- ° Jeff Moss, University of Illinois
- ° L. H. Newcomb, The Ohio State University
- ° Kerry S. Odell, West Virginia University
- ° J. Dale Oliver, Virginia Tech
- ° Ed Osborne, University of Illinois
- ° Edgar Persons, University of Minnesota
- ° Glen C. Shinn, Clemson University
- ° Bob Stewart, University of Missouri-Columbia
- ° Paul Vaughn, Mississippi State University
- ° George Wardlow, University of Minnesota
- ° David L. Williams, Iowa State University

In addition, the following members of the profession gave their time, efforts, and expertise in the conduct of the meeting. Their efforts were much appreciated.

Discussants

- ° Gary E. Briers, Texas A&M University
- ° Julia Gamon, Iowa State University
- ° Thomas L. Grady, University of Wisconsin-Madison
- ° Ray V. Herren, University of Georgia
- ° James P. Key, Oklahoma State University
- ° Barbara Malpiedi Kirby, North Carolina State University
- ° J. Dale Oliver, Virginia Tech

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- ° Betty C. Harrison, Louisiana State University
- ° Joe Kotrlik, Louisiana State University
- ° Jeffrey Moss, University of Illinois
- ° Fred Sanders, Louisiana State University

Outstanding Paper Presentation Evaluators

The Outstanding Research Paper Presentation Committee is a sub-committee of the Research Committee, Agricultural Education Division, American Vocational Association. The purpose of the committee is to select the Outstanding Research Paper Presentation at the annual NAERM. The Chairperson of the Committee this year was Jan Henderson of The Ohio State University. Committee members were Stan Burke, Virginia Tech and Jim Key, Oklahoma State University. The committee identified evaluators to rate presentations made at the meeting. Research paper presentations for the 1989 NAERM were evaluated by Discussants and selected at large members of the profession. Their efforts are appreciated very much.

Each of the above individuals contributed time and effort to the conduct of the meeting. It was through the individual contributions made by each person that the meeting was a success. My sincere appreciation goes to all who assisted. Your willingness to serve helped make chairing the meeting a pleasure.

Mike Burnett, Chairperson
1989 National Agricultural
Education Research Meeting

ANALYSIS OF THE COMPUTER ANXIETY LEVELS OF VOCATIONAL AGRICULTURE TEACHERS

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INTRODUCTION

The introduction of microcomputers (hereafter referred to as computers) into vocational agriculture and other vocational programs has created mixed reactions among teachers. Some believe that the computer is an indispensable tool while others continue to resist its incorporation into their programs.

Several researchers have addressed the computer competencies needed by students and their teachers and the attitudes of these individuals towards computers (Birkenholz & Harbstreit, 1987; Bowen, Mincemoyer & Parmley, 1983; Henderson, 1985; Miller & Kotrlik, 1987; Neason & Miller, 1982; Newman & Henderson, 1987; Trede, Russell & Miller, 1985; Zidon & Luft, 1987). Other writers have addressed the educational uses of the computer (Hudson, 1980; Taylor, 1980). However, the dual problems of computer anxiety and computer anxiety related integration problems have not been addressed in vocational education research.

Several studies of computer anxiety have been conducted in other disciplines. Raub (1982) found five variables to be significantly correlated with computer anxiety among college students. These variables were gender, college major, computer experience, math anxiety, and trait anxiety. Rankin (1984) studied the interaction of anxiety, sex, and age using computer assisted instruction with community college students. Females had a higher anxiety score than males even though they did significantly better in both the conventional and the computer assisted instructional setting. Rankin concluded that anxiety had no effect on performance.

Johassen (1985) used Spielberger's State-Trait Anxiety Inventory, Form Y, to study whether increased levels of computer anxiety in participants who used computers to input their responses were associated with computers. This study provided some evidence that computer anxiety increases when participants are exposed to computers.

Johnson (1987) examined the effects of training on levels of writing apprehension and computer anxiety in elementary school teachers. Computer anxiety was assessed using Maurer and Simonson's Computer Anxiety Index. The study found that training may contribute to reductions in computer anxiety for elementary school teachers. Johnson also found that age correlated positively with computer anxiety and that gender was found to be unrelated. Johnson recommended further study of selected variables and their effect on writing apprehension and computer anxiety in classroom teachers.

Bellando and Winer (1985) reported that Holland's Artistic and Social types reported a significantly greater amount of computer anxiety as measured by the Computer Anxiety Scale (COMPAS) than the other four Holland types - Realistic, Investigative, Conventional, and Enterprising. They determined that there is some validity to classifying people according to Holland types to determine levels of computer anxiety.

Jones and Wall (1987) used the Computer Anxiety Index (CAIN) to analyze the relationship between amount of computer exposure and computer anxiety scores for graduate and undergraduate students. The results suggested that graduate

students with continuous exposure to computers showed greater reduction of anxiety scores and higher than predicted scores on a standard measure of computer literacy. No significant relationships were found between gender and computer anxiety for undergraduate students, although the results did lend support to the proposition that there is a significant relationship between computer anxiety and computer experiences/exposure.

Several definitions for computer anxiety exist. Johassen (1985) defined computer anxiety as "the state that results when people fear using computers or are faced with the prospect of using computers" and Maurer and Simonson (1984) portrayed computer anxiety as "the irrational fear or apprehension felt by an individual when using computers or when considering the possibility of computer utilization." Oetting (1983) defined computer anxiety as "the anxiety that people feel they will experience when they are interacting with computers -- the anxiety associated with the concept of computers" (p. 1). Cantrell (1982) termed the fear and anxiety associated with use of a computer as "computerphobia."

A review of previous research reveals that computer anxiety in varying degrees, rather than the anticipated math anxiety, is being experienced. Bertz (1978) and Fennema and Sherman (1976) have shown that just as the learning of mathematics has been affected by math anxiety, it is very likely that computer anxiety affects both choosing to learn about computers and the mastery of computer skills.

Rationale for the Study

Computer anxiety levels of vocational agriculture and other vocational teachers may be an important consideration in the process of incorporating computers into vocational agriculture programs. If the level of computer anxiety being experienced and the factors related to computer anxiety can be identified, then steps can be taken during the planning of pre and inservice education to alleviate these problems. This study was designed to make this determination.

Even though much has been reported in the area of computer competencies, computer use, and attitudes toward computers, few researchers have studied computer anxiety. Computer anxiety levels of vocational agriculture teachers has not been studied even though several authors touch on the computer anxiety issue in their research. This study measured computer anxiety levels of vocational agriculture and other vocational teachers and determined which variables explained significant proportions of the variance in computer anxiety.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the factors related to the computer anxiety levels of vocational agriculture and other vocational teachers. The objectives were:

1. Determine the computer anxiety levels being experienced by vocational teachers.
2. Determine if a difference exists between the levels of computer anxiety experienced by vocational agriculture teachers and other vocational teachers.
3. Determine if a difference exists between the levels of computer anxiety experienced by male and female vocational teachers.
4. Determine the variance in the vocational teachers computer anxiety levels that can be explained by selected variables. The variables used in this analysis were: Computer skills, principal's support, computer availability, math ability, formal computer training, age, and sex.

PROCEDURE

The population consisted of all secondary vocational teachers in Louisiana in four programs: Agriculture, home economics, business and office, and industrial arts education ($N = 2,362$). The sample was drawn from a database maintained by the researcher. Cochran's sample size formula (Snedecor and Cochran, 1980) was used to select a stratified random sample of 367.

Oetting's (1983) Computer Anxiety Scale (COMPAS) was selected to measure computer anxiety because of several factors including stability in measurement, demonstrated content and discriminant validity, and high reliability. The long form consists of 48 Likert-type items for which respondents report their subjective feelings of anxiety. The COMPAS has seven subscales (hand calculator, trust, general attitude, data entry, word processing, business operations, computer science). The general computer anxiety scale range is from 40 to 200. The range for the computer anxiety subscales is from 4 to 20.

Oetting (1983) maintains there are three types of anxieties. Two, trait and state anxieties, "are commonly referred to by psychologists. Trait anxiety is the general pervasive anxiety experienced by a person over the entire range of life experiences. State anxiety, on the other hand, is the anxiety that a person is experiencing right now, at this moment in time" (p. 1). Oetting's COMPAS "is based on a third type, concept-specific anxieties, which fill the gigantic range between general trait anxiety and state anxiety. They are the anxieties that people associate with specific situations" (p. 1).

Oetting's studies using the COMPAS instrument revealed that computer anxiety was highly related to computer test anxiety ($r = .70$) which is a measure of "taking examinations where you had to use a computer" and moderately related to Suinn's Math Anxiety Rating Scale ($r = .40$). Computer anxiety had a low correlation with the Theme or Term Paper Anxiety measure ($r = .19$). Oetting concluded that even though computer and math anxiety seem to be related, the COMPAS is not measuring math anxiety.

Psychologists Benjamin Kleinmuntz and Steven Wise (Mental Measurements Yearbook, 1985) reviewed the COMPAS. Although Kleinmuntz questioned the importance of measuring computer anxiety, both reviewers concluded that if one wishes to measure computer anxiety, COMPAS is the test to use.

A second instrument was used to collect demographic and computer related information. Both instruments were field tested using 15 vocational teachers who were not a part of the sample. Minor changes in the demographic and computer related information instrument suggested by the field test were incorporated into the final version of the instrument.

Reliability of the COMPAS was assessed using Cronbach's Alpha and found to match the reliability claimed by Oetting (1983). For the COMPAS scale, the reliability was calculated as $\alpha = .96$ in this study and as $\alpha = .96$ or $.97$ in previous studies. The reliability coefficients for the seven subscales ranged from $.72$ to $.86$ in previous studies and from $.72$ to $.84$ in this study.

After two mailings, two post-card follow-ups, and a telephone follow-up, a response of 294 (80%) was achieved. Comparisons using a t -test between those who responded by mail and those who responded by phone yielded no statistically significant differences and the data were combined for data analysis. The data were analyzed using descriptive statistics, inferential t -tests (using pooled variance estimates) and step-wise multiple regression. The alpha level was established a priori at $.05$. For the regression analysis, a variable had to make a statistically significant addition in explained variance and explain at least one percent of variance in addition to the variance already explained by the other variables to be declared a significant explanatory variable.

FINDINGS

Objective 1

The COMPAS score for the sample was 104.4 (S.D. = 32.7) on a scale that ranged from 40 to 200. This score is lower than the 109.8 reported for college students by Bellando and Winer (1985) and the 110.8 reported for county level extension agents by Smith and Kotrlik (1988). The distribution of scores suggest that some vocational teachers may be experiencing computer anxiety. The COMPAS manual indicates "some mild anxiety present" beginning at scores of 105 for college students. Almost half (48.3%) of the teachers indicated they were experiencing some computer anxiety.

Table 1 summarizes the COMPAS scores. Anxiety scores on three subscales revealed that fewer than one-fourth of the agents experienced anxiety with a hand calculator, trust of computers, and general attitude toward computers. Fewer than one-half of the respondents indicated they were anxious with data entry, word processing, and business operations work. Two-thirds of the teachers (66.7%) experienced anxiety as indicated by the computer science subscale.

Table 1

COMPAS Scores for Louisiana Vocational Teachers (N = 283)

Scale	<u>M</u>	<u>SD</u>	% experiencing anxiety ^a
General computer anxiety ^b	104.4	32.7	48.3
Subscales ^c :			
Hand calculator	6.8	2.5	6.5
Trust	6.3	2.6	6.5
General attitude	7.3	3.0	16.3
Data entry	9.0	3.5	34.7
Word processing	9.1	4.1	38.8
Business operations	9.6	4.2	41.5
Computer science	12.5	4.2	66.7

^aThese percentages were derived from comparing the teachers scores to COMPAS profile data (Oetting, 1983). ^bRange = 40-200. The ranges and categories for the COMPAS were 40-79, very relaxed/confident; 80-104, generally relaxed/comfortable; 105-129, some mild anxiety present; 130-149, anxious/tense; and 150-200, very anxious. ^cRange = 4-20. The ranges and categories for the COMPAS were 4-8, very relaxed/confident; 9-10, generally relaxed/comfortable; 11-12, some mild anxiety present; 13-14, anxious/tense; and 15-20, very anxious.

Objective 2

Table 2 displays a comparison of the computer anxiety levels of vocational agriculture teachers and other vocational teachers. No differences existed between these two groups on their overall scores or on their subscale scores.

Table 2

Computer Anxiety Levels of Vocational Agriculture and Other Vocational Teachers

Scale	Vocational teachers (n = 223)		Voc. agric. teachers (n = 71)		t
	Mean	S.D.	Mean	S.D.	
General computer anxiety	102.6	34.4	110.1	26.1	1.67
Subscales:					
Hand calculator	6.7	2.7	6.9	1.8	.48
Trust	6.2	2.5	6.7	2.8	1.50
General attitude	7.1	3.0	7.7	2.9	1.40
Data entry	8.8	3.6	9.6	3.1	1.82
Word processing	8.9	4.2	9.6	3.8	1.19
Business operations	9.4	4.3	10.0	3.5	1.12
Computer science	12.4	4.4	12.9	3.6	.81

NOTE. The general computer anxiety scale range is from 40 to 200. The range for the computer anxiety subscales is from 4 to 20.

Objective 3

Table 3 shows a comparison of computer anxiety by sex. Female teachers had higher anxiety levels than male teachers in three areas. No differences existed between these two groups on their overall scores or on the other subscale scores.

Table 3

Comparison of Computer Anxiety Levels of Vocational Teachers by Sex)

Scale	Male teachers (n = 223)		Female teachers (n = 71)		t
	Mean	S.D.	Mean	S.D.	
General computer anxiety	101.2	33.0	107.6	32.1	1.67
Subscales:					
Hand calculator	6.6	2.6	6.9	2.4	.88
Trust	6.0	2.4	6.7	2.7	2.28*
General attitude	6.9	2.9	7.6	3.0	1.84
Data entry	8.6	3.5	9.4	3.4	2.12*
Word processing	8.4	4.0	9.7	4.1	2.79*
Business operations	9.2	4.1	10.0	4.2	1.65
Computer science	12.6	4.3	12.5	4.2	.23

NOTE. Pooled variance estimates were used in these analyses. The general computer anxiety scale range is from 40 to 200. The range for the computer anxiety subscales is from 4 to 20.

Objective 4

Table 4 displays the results of the multiple regression analysis. Five variables explained 45% of the variance in the COMPAS score. Teachers with no or low levels of computer skills, teachers who perceived they did not have their principal's support in the use of computers, teachers who had computers available at school, teachers who perceived they had low math ability, and teachers without formal computer training were more likely to have higher levels of computer anxiety. Although all variables used in this analysis were selected based on previous research, two variables (age and sex) that had been related to computer anxiety in other research did not explain a significant percentage of the variance in this study.

Table 4

Multiple Regression Analysis of COMPAS Scores (N = 283)

Source of Variation	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F-ratio</u>	Prob. of <u>F</u>
Regression	141135	6	23523	46.2	.0000
Residual	162817	276	590		
Total	303952	282	24103		
<u>Variables in the equation</u>					
Variables	<u>R²</u>	<u>Cum. R²</u>	<u>F</u>	Prob. of <u>F</u>	
Teacher's level of computer skills	.360	.360	159.7	.0000	
Principal's support of computer use	.034	.394	92.7	.0000	
Computer availability at school	.026	.420	69.1	.0000	
Perceived mathematical ability	.013	.433	54.9	.0000	
Received formal computer training	.012	.445	46.2	.0000	
<u>Variables not in the equation</u>					
Variables	<u>t</u>	<u>Sign. t</u>			
Age	1.40	.16			
Sex	.81	.42			

CONCLUSIONS

No differences exist between the computer anxiety being experienced by vocational agriculture teachers and other vocational teachers.

It does not appear that vocational teachers are experiencing higher than normal computer anxiety levels. The distribution of scores suggest that some vocational teachers are experiencing anxiety ranging from mild to intense.

Differences do exist between the computer anxiety levels of male and female teachers for three of the seven COMPAS scales. The three scales for which differences existed were trust, data entry, and word processing. A higher level of anxiety was recorded for females on all three scales.

The regression analysis revealed five significant explanatory variables. The five variables were teacher's level of computer skills, principal's support of computer use, computer availability at school, perceived mathematical ability, and whether the teacher had received formal computer training.

IMPLICATIONS AND RECOMMENDATIONS

The variables that explained significant amounts of variance in computer anxiety should be considered by teacher educators and state supervisors when planning computer related preservice and inservice activities and when advising teachers on the purchase of computers and related equipment.

State supervisors and teacher educators should take appropriate steps to provide computer training to upgrade vocational teachers' computer skills. This action by itself holds the most realistic promise for reducing computer anxiety levels of vocational teachers.

Additional research should be conducted to identify other variables that may contribute to the computer anxiety levels of vocational teachers. The variables identified in this study may be adequate to initiate activities to lower computer anxiety. As additional variables are found, an improved understanding of computer anxiety will enable teacher educators and state staff to provide additional remedies for computer anxiety.

Further research is also needed to determine the extent to which computer anxiety of vocational teachers is related to their trait and state anxiety levels. This appears to be a fertile area for future research.

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ANALYSIS OF THE COMPUTER ANXIETY LEVELS OF VOCATIONAL AGRICULTURE TEACHERS

A Critique

Randol G. Waters, University of Tennessee--Discussant

The authors of this paper suggest that varying levels of computer anxiety may impact upon teachers' willingness to incorporate the use of microcomputers into their educational programs. The review of literature substantiates that computer anxiety does indeed exist among various student and teacher groups. It further substantiates that a number of demographic variables appear to relate to the level of anxiety one possesses regarding computers.

The purpose of the study is clearly stated and the rationale is adequately supported. The objectives are stated in a manner which suggests that several independent inferential tests will be employed in the analysis of data. The procedures section of the paper is written very clearly and the choice of the Oetting instrument is adequately supported as a measure of computer anxiety. Further, the authors are to be commended for their meticulous follow-up procedures which resulted in an 80 percent response rate and strong evidence that the sample they used was indeed representative of the entire sampling frame. The internal consistency data they developed for their sample provide additional support of the reliability of the Oetting instrument.

Following are a few observations and suggestions the authors may wish to consider as they continue their research.

- Although the objectives were stated in terms which called for three separate inferential tests, much more information could have been gained if all independent variables (including gender and type of teacher) would have been included in the regression model. Although the main effects of gender and type of teacher did not significantly related to scores on the computer anxiety scales, they, along with the other independent variables studied, may interact in some way to explain even more variance in anxiety scale scores.
- Also regarding the reporting of the regression analysis, it would have been informative to discuss the direction of the relationships of the independent variables with the dependent variables. Inclusion of a list of slope (*b*) values in Table 4 would help in describing these relationships. A table of predicted means for each dependent variable would also be useful.
- One minor editorial suggestion prior to final publication; the authors should also note that a number of studies have been mentioned in the text of the paper which need referencing in the bibliography.

In conclusion, the paper is generally well written. The review of literature is quite thorough and the procedures for data collection were very appropriate. Although the analysis of data addresses each of the objectives, the researchers may wish to consider a slightly more complex model of analysis to explore possible interactive effects of their selected variables upon computer anxiety scale scores, especially since the review of literature supported the theory that gender should significantly relate to computer anxiety.

ASSESSING PERFORMANCE AND PLANNING INSERVICE NEEDS OF FIRST-YEAR VOCATIONAL AGRICULTURE TEACHERS

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INTRODUCTION

Needs assessment has been defined as a process "to discover weaknesses or problem areas in the current situation which can eventually be remedied" (Herman, Morris, & Fitz-Gibbon, 1987, p. 15). Witkin (cited by Lentz, 1983) viewed needs assessment as the kinds and degrees of discrepancy that exist between a desired state of affairs and the present condition (p. 35).

A needs assessment model presented by Borich (1980) was based upon existence of a difference between "what is" and "what should be" (p. 13). Borich maintains that a training program can apply the model by defining "what is" as the measured behaviors, skills and the competencies of the trainee and "what should be" as the goals of the program. Differences between "what is" and "what should be" can then be used as a measure of the needs.

New teachers of vocational agriculture in Ohio who enter the teaching profession without a degree in agricultural education participate in a four-week intensive professional education workshop. During the first year of teaching, the new teachers receive on-site supervision from teacher educators, and they attend a follow-up workshop during the summer after the first year. The content of the first workshop is based upon a list of 25 instructional competencies identified by the Ohio Department of Education, Division of Vocational Education, as essential for the professional preparation program of teachers recruited from business and industry. The content of the second workshop and the needs to be addressed during the on-site supervision should be determined, based on those 25 competencies.

A needs assessment of the 25 competencies was conducted by Barrick and Powell (1985). However, no further assessment of needs of agriculture teachers recruited from business and industry has been conducted since this original assessment. To determine if the current inservice curriculum is meeting the needs of industry-recruited teachers, a replication of the 1985 Barrick and Powell study was conducted.

PURPOSE AND OBJECTIVES

The purpose of the study was to identify the inservice needs of first-year vocational agriculture teachers. The objectives were to:

1. Determine the perceptions of the teachers regarding the importance of the 25 competencies to their teaching.
2. Determine the perceptions of the teachers regarding their knowledge of the 25 competencies.
3. Determine the priorities of the teachers for further inservice education on the 25 competencies.

PROCEDURES

This study was part of a larger study conducted by the principal investigator that included teachers in all vocational areas. The population for the portion reported in this paper was all first-year vocational agriculture teachers in Ohio who attended the four-week intensive professional education workshop in 1984, 1985, 1986, 1987 or 1988 and all first-year college prepared teachers for the years of 1986 and 1988. Seventy-nine teachers were in the study.

Data were collected using an instrument designed by the researchers. Respondents indicated their perceptions of the importance of the topic and their knowledge of the topic for all 25 competencies on a scale of 1 (low) to 5 (high). Using the Borich Model, weighted discrepancy scores were computed by subtracting the knowledge score from the importance score and multiplying the difference times the importance score. The instrument was assessed to be reliable based on Cronbach's alpha of .87.

Instruments were mailed in February of 1985, 1986, 1987, 1988, and 1989 to the teachers. A 100% response rate was achieved after two mailings and a follow-up telephone call.

ANALYSIS OF DATA

The population of this study consisted of regularly and industry-prepared agricultural teachers in Ohio. Regularly-prepared teachers refers to those teachers who had completed a teacher education program of courses at an accredited college/university culminating in a bachelor's degree in agricultural education and received a four-year provisional teaching certificate. Industry-prepared teachers refers to those teachers who had not completed a teacher education program of courses. Rather, these teachers typically have worked in an occupation for a specified number of years and had chosen to become teachers. Based on the results of Doerfert & Barrick (1989) where these two groups were found to be similar in their perception, the data for these two groups of agricultural teachers were combined for further analysis.

Mean scores for each topic for each year were calculated for the 25 competencies on the importance rating and the knowledge rating. Weighted discrepancy scores were computed for the 25 competencies for each year. The competencies were then rank-ordered, based on the weighted discrepancy scores. A larger difference between importance and knowledge times a higher importance rating would yield a higher needs ranking on the weighted score rank. The relative position of the weighted scores within a ranking determines the priorities based on importance and knowledge of the competency.

RESULTS

Importance scores ranged from 3.18 to 4.73 (on the 5-point scale) in 1984, 3.50 to 4.86 for the 1985 group, 3.65 to 4.92 for the 1986 group, 3.71 to 4.71 for the 1987 group, and 3.71 to 4.90 for the 1988 group. Competencies typically rated highest in importance included (a) managing student behavior, (b) teaching safety, (c) motivating students, (d) managing student learning in the lab, (e) managing student learning in the classroom, and (f) understanding teacher liability.

Competencies typically rated lowest in importance were: (a) writing behavioral objectives, (b) writing duties and task statements, and (c) becoming involved in professional organizations.

Knowledge score ranged from 2.79 to 4.18 for the 1984 group, 2.21 to 4.29 for the 1985 group, 3.12 to 4.19 for the 1986 group, 2.86 to 4.50 for the 1987 group, and from 3.38 to 4.43 for the 1988 group. Highest rated knowledge competencies were: (a) teaching safety, (b) obtaining a teaching certificate, (c) preparing teaching materials, and (d) preparing lesson plans.

Competencies typically rated lowest in knowledge included (a) working with disadvantaged and handicapped students, (b) advising the vocational student organization, and (c) working with handicapped and disadvantaged students.

The weighted discrepancy scores were used to rank the competencies on the basis of importance and knowledge considered simultaneously. The top competencies on the ranking included (a) managing student behavior, (b) managing student learning in the lab, (c) motivating students, (d) managing student learning in the classroom, and (e) understanding teacher liability.

CONCLUSIONS AND RECOMMENDATIONS

Based on the data, the following conclusions and recommendations are presented.

1. Student management techniques are rated as important to first-year teachers. Additional attention should be given to management topics during the intensive workshop.

2. Understanding teacher liability has shown an increased need during recent years. This competency should be addressed more fully during some portion of the program.

3. Although not rated high on importance, the ratings on knowledge indicated that competencies such as working with disadvantaged and handicapped students should be addressed more adequately during some portion of the program.

4. The needs of first-year agriculture teachers have changed since the needs assessment conducted by Barrick and Powell (1985). The curriculum of inservice workshops should be modified accordingly.

5. Teachers identified the competencies that are the highest concern for them, based on the weighted rankings. Teacher educators should address those concerns during on-site supervision. Those competencies should also be included in the follow-up workshop.

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Table 1

Importance of Competencies as Perceived by Teachers

	Mean Importance				
	1984 n=11	1985 n=14	1986 n=26	1987 n=7	1988 n=21
Using advisory committees	4.00	3.86	4.00	3.86	4.33
Writing duties and tasks	3.45	3.93	3.81	4.00	4.10
Preparing lesson plans	4.18	4.71*	4.38	4.71*	4.62
Managing student learning in the classroom	4.55*	4.71*	4.50	4.71*	4.62
Managing student learning in the lab	4.55*	4.86*	4.48	4.67	4.71*
Preparing evaluation strategies	--	--	4.12	4.29	4.29
Advising the vocational student organization	3.64	3.50	4.20	4.00	4.10
Understanding the principles of teaching and learning	4.27	4.36	4.38	4.43	4.48
Writing behavioral objectives	3.18	3.57	3.84	3.71	3.90
Preparing and using instruc- tional materials	4.55*	3.93	4.69*	4.57	4.57
Teaching safety	4.64*	4.79*	4.92*	4.43	4.90*
Planning instructional strategies	4.00	4.43	4.23	3.71	4.29
Obtaining a teaching certificate	4.64*	4.57	4.31	4.29	4.38
Writing a course outline	4.36	4.64	4.15	4.43	4.10
Managing student behavior	4.73*	4.86*	4.77*	4.71*	4.76*
Motivating students	4.55*	4.86*	4.85*	4.71*	4.90*
Becoming involved in professional organizations	3.64	3.71	3.65	4.29	3.71
Understanding the role of an instructor	4.09	3.86	4.31	4.57	4.38
Working within the school system	4.45	4.29	4.54	4.57	4.48
Employing public relations principles	3.91	4.43	4.62	4.29	4.33
Understanding teacher liability	4.55*	4.57	4.58	4.71*	4.71*
Being aware of sex equity	4.18	3.57	4.20	4.43	4.29
Dealing with individual differences	4.55*	4.64	4.69*	4.00	4.62
Working with handicapped and disadvantaged students	4.09	4.40	4.00	4.00	4.38
Practicing teaching	--	--	4.40	4.57	4.29

Scale: 1 = low, 5 = high

*Ranked within top 5 competencies.

Table 2

Knowledge of Competencies as Perceived by Teachers

	Mean Knowledge				
	1984 n=11	1985 n=14	1986 n=26	1987 n=7	1988 n=21
Using advisory committees	3.09	3.23	3.44	3.29	3.86
Writing duties and tasks	3.45	3.38	3.38	3.57	3.86
Preparing lesson plans	3.73*	3.86*	4.08*	4.29*	4.05
Managing student learning in the classroom	3.36	3.29	3.88	4.14*	3.90
Managing student learning in the lab	3.18	3.29	3.88	4.00	4.00
Preparing evaluation strategies	--	--	3.23	3.71	3.62
Advising the vocational student organization	3.00	2.21	3.12	2.86	3.43
Understanding the principles of teaching and learning	3.00	3.43	3.85	3.86	4.05
Writing behavioral objectives	3.09	3.00	3.36	3.43	3.60
Preparing and using instruc- tional materials	3.82*	2.79	4.04*	4.00	4.10*
Teaching safety	4.18*	4.29*	4.19*	4.00	4.43*
Planning instructional strategies	3.27	3.07	3.62	3.14	3.81
Obtaining a teaching certificate	4.09*	4.08*	4.00*	4.50*	3.95
Writing a course outline	3.36	3.50	3.73	3.86	3.62
Managing student behavior	3.27	3.00	3.88	3.86	4.35*
Motivating students	3.73*	3.00	3.73	3.71	4.25*
Becoming involved in professional organizations	3.36	3.64*	3.31	3.57	3.38
Understanding the role of an instructor	3.60	3.57	3.85	4.00	4.10*
Working within the school system	3.64	3.64*	3.62	4.14*	3.95
Employing public relations principles	3.55	3.64*	3.62	3.86	3.95
Understanding teacher liability	3.73*	3.07	3.58	4.14*	3.57
Being aware of sex equity	3.64	3.71*	3.92*	4.14*	3.86
Dealing with individual differences	3.55	3.29	3.85	3.86	4.00
Working with handicapped and disadvantaged students	2.79	3.14	3.15	3.29	3.38
Practicing teaching	--	--	3.68	4.00	3.86

Scale: 1 = low, 5 = high

*Ranked within top 5 competencies.

Table 3

Priorities of Competencies as Perceived by Teachers

	Mean Priority Score				
	1984 n=11	1985 n=14	1986 n=26	1987 n=7	1988 n=21
Using advisory committees	3.55	2.92	2.72	2.86	2.67
Writing duties and tasks	0.82	2.92	1.85	2.00	1.57
Preparing lesson plans	2.27	4.14	1.92	2.00	2.81
Managing student learning in the classroom	5.64*	7.14*	2.96	2.71	3.71*
Managing student learning in the lab	6.36*	7.71*	3.08	3.17	3.52*
Preparing evaluation strategies	--	--	4.23	2.57	3.00
Advising the vocational student organization	2.55	5.29	5.00*	5.14*	2.95
Understanding the principles of teaching and learning	6.09*	4.50	2.54	2.57	2.33
Writing behavioral objectives	0.91	2.43	2.40	1.71	1.80
Preparing and using instructional materials	3.45	5.21	3.12	2.71	2.38
Teaching safety	2.45	2.64	3.65	2.14	2.38
Planning instructional strategies	3.27	6.64	2.88	2.43	2.43
Obtaining a teaching certificate	2.82	2.46	1.85	1.67	2.14
Writing a course outline	4.82*	5.71	2.12	2.86	2.48
Managing student behavior	7.27*	9.00*	4.38	4.00*	2.00
Motivating students	4.82*	9.29*	5.46*	4.57*	3.50*
Becoming involved in professional organizations	1.27	0.71	1.77	3.29*	2.05
Understanding the role of an instructor	2.10	1.29	2.08	2.57	1.33
Working within the school system	3.73	2.93	4.58*	1.86	2.57
Employing public relations principles	1.91	4.07	4.69*	2.00	1.67
Understanding teacher liability	4.00	7.50*	5.15*	2.71	5.62*
Being aware of sex equity	2.73	0.29	1.56	1.43	2.10
Dealing with individual differences	4.82*	6.57	4.19	1.00	3.00
Working with handicapped and disadvantaged students	5.95	5.65	4.08	3.29*	5.00*
Practicing teaching	--	--	3.40	2.86	2.38

Priority Score = (Importance Score - Knowledge Score) Importance Score

*Top 5 inservice needs.

ASSESSING PERFORMANCE AND PLANNING INSERVICE NEEDS OF
FIRST-YEAR VOCATIONAL AGRICULTURE TEACHERS

A Critique

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This basically was a replication study designed to update a study reported to NAERM in 1986. It expanded that study to include two years of data from "regularly-prepared teachers" as well as the data from "industry-prepared teachers" for an additional three years. This strengthened the study by giving it a broader base. The strengths of this study were the same as the 1986 study as critiqued by Richard Carter from Iowa State University. The assessment had a sound base established on the list of 25 instructional competencies identified by the Ohio State Department of Education. The assessment techniques had precedents set through other studies, and even the same study once before. The 100% response rate for the population surveyed would have to be complimented in any study. The internal consistency of the instrument, as reported through Cronbach's Alpha was quite adequate. An additional strength of this study was the thorough explanation of the use and calculation of the Borich Model. In fact, it was explained twice in the narrative and shown again in the table. That weakness in the 1986 paper was thoroughly corrected in this one. One other strength for both studies should be noted. Since populations were surveyed, descriptive statistics were correctly used to report the data. Inferential statistics would have been inappropriate.

There were, however, some questions raised which were not answered by this paper. It was stated that the "Regularly-prepared" and "Industry-prepared" teacher responses were combined because of similarity determined in a study by Doerfelt & Barrick (1989). The paper did not tell us the basis of that determination and the (1989) study was not listed in the references, so that basis could not be determined. There were 25 teaching competencies in this study compared to 26 in the 1986 study. By observation it was determined that "Working with handicapped students" and "Working with disadvantaged students" had been combined into one competency. The question was, why? A weakness discussed about the 1986 study is also included for this study. It is not clear how the results were analyzed as a basis for the conclusions and recommendations. Examples were the conclusions and recommendations written concerning student management techniques and understanding teacher liability. Motivating students ranked as high, if not higher than those two, but was not mentioned in the conclusions and recommendations. There were many ways the data could have been analyzed, such as across years, latest year, combined years and others. It was not clear what analysis was used as the basis. The question raised by conclusion and recommendation #3 was, why? If these competencies were not deemed important, why do they need to be addressed more adequately during some portion of the program? Incidentally, the replicated study, indicated in the references to have been reported to NAERM in 1985 was actually reported in 1986. It is amazing how these reference mistakes can sneak into a paper. Overall, this was a fine study, adding much to our body of knowledge about inservice needs of first-year agriculture teachers.

ASSESSMENT OF THE PREPARATION AND CAREER PATTERNS OF
AGRICULTURAL EDUCATION GRADUATES, 1975-1987

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INTRODUCTION

Teacher preparation and the process through which teachers become prepared to teach greatly influences the quality of educational programs conducted in the public schools. Consequently, efforts must be made to evaluate the effectiveness of teacher-preparation programs and the career patterns of graduates. Follow-up studies are one of the most commonly used measures in evaluating educational programs. According to Denton (1979), follow-up data provide faculty with qualitative ratings of the program, perceived needs of the teacher, and insights into skills required in teaching which may not have been stressed by the existing teacher education program. Additionally, follow-up studies provide evidence regarding the career patterns of graduates.

Although follow-up studies are valuable in providing information regarding student outcomes and program effectiveness, there are reasons of accountability that are also important. They provide evidence of program effectiveness to outside audiences. Neth and Hanson (1976) stated that post-program follow-up studies have traditionally been an integral component of educational research. Recently, as a result of economic and social pressures, there has been a growing demand for accountability, and follow-up studies have received special emphasis.

The determination of graduates' perceptions of their preparation program as well as their career patterns is useful for making program revision decisions. Likewise, the identification of the demographic characteristics of graduates is important to develop a profile of individuals who complete the program.

The role of the vocational agriculture teacher requires competency in a variety of areas. These competencies are derived from the three basic dimensions of the preservice preparation program: general education, technical agriculture, and professional education. A program that is an appropriate combination of these dimensions should prepare competent and effective teachers (Burnett & Yahya, 1987).

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the career patterns of graduates in agricultural education from the University of Florida during the period 1975-1987, and to assess their perceptions related to effectiveness of selected aspects of the program in agricultural education in preparing them for careers.

Specifically, the study sought to:

1. Determine the perceptions of graduates regarding the quality of selected educational experiences at the University of Florida and the Department of Agricultural and Extension Education.
2. Identify demographic characteristics regarding agricultural education graduates.

3. Identify the professional characteristics and career patterns of agricultural education graduates.

RESEARCH PROCEDURE

The population for the study consisted of all agricultural education graduates, both bachelor and/or master's degree recipients, for the years 1975 through 1987, who completed student teaching and teacher certification while pursuing their degrees at the University of Florida. Names and the last known addresses of graduates were obtained from student files, the Office of the Dean for Resident Instruction, or through personal contact. As a result, 206 agricultural education graduates were identified.

In order to obtain requisite information, a mail questionnaire was developed to gather data from graduates. The questionnaire was reviewed by faculty members and field tested with graduate students in the Department of Agricultural and Extension Education to insure content validity. Six Likert-type scales were developed to obtain respondents' perceptions of selected variables. Scale reliability was determined using Cronbach's alpha. The alpha values were as follows: pre-professional courses (.80), technical agriculture courses (.89), agricultural education courses (.88), student advisement (.81), teaching behaviors of faculty (.74), and benefits of the Agricultural Education Society (.96).

Data for years 1975-85 were collected between September, through December, 1986. Data for 1986-87 were obtained from May - September, 1988. All 206 graduates identified were sent a cover letter and a questionnaire. After an initial mailing and two follow-ups, it was determined that 29 of the graduates could not be located, thus making the accessible population 177.

A total of 151 (85.3%) completed questionnaires were received from former students. From the 26 non-respondents, a random sample of 5 non-respondents was drawn and telephoned. They were asked to respond to selected items on the questionnaire. An analysis of this information revealed no significant differences between respondents and non-respondents. Thus, it was concluded that the results are generalizable to the population.

FINDINGS

PERCEPTIONS OF COURSEWORK

Graduates were asked to respond on a five-point Likert scale that ranged from poor (1) to excellent (5) with regard to their perceptions concerning the adequacy of pre-professional, technical, and agricultural education coursework. The mean responses for the three coursework areas were 3.67, 3.83, and 4.0 respectively. This would indicate that the respondents felt the coursework was good to excellent.

When asked to indicate whether the amount of coursework should be decreased, maintained, or increased in each of the three categories, the majority of the respondents indicated that pre-professional coursework should be maintained (81.2%), technical coursework increased (69.5%), and agricultural education coursework should be maintained (65.1%).

QUALITY OF ADVISEMENT

Data in Table 1 reflect the respondents' perceptions of the quality of advisement by the agricultural education faculty. Respondents were able to choose among strongly disagree, disagree, undecided, agree, and strongly agree in referring to the types of advisement listed. Numerical values were assigned to each of the choices and ranged from 1 for strongly disagree to 5 for strongly agree. Most respondents perceived the quality of advisement they received from faculty as very satisfactory. Mean scores ranged from 4.12 to 4.63 which would indicate graduates believed that advisement was very good.

QUALITY OF TEACHING

Table 2 reflects the graduates' perceptions of the teaching behavior of the agricultural education faculty. Most respondents were well satisfied with the teaching behavior displayed by the faculty. Data in Table 2 reveal that respondents more frequently agreed or strongly agreed with the teaching behaviors listed than those choosing a response of agree, disagree, and strongly disagree. Mean response values ranged from 4.32 to 4.44 indicating that the respondents perceived teaching quality to be quite high.

PARTICIPATION AND PERCEPTIONS OF STUDENT ORGANIZATIONS

Fifty-four (36%) of the respondents stated that they were somewhat actively involved in the Agricultural Education Society (AES) while fifty-three (35.3%) stated that they were very actively involved. The remaining 28.7% were either not a member or paid their dues but were not involved. Of those who were members, they generally believed that involvement helped them to understand agricultural education/vocational agriculture (77.6%), helped develop leadership skills (79.1%), helped them accept and carry out responsibilities (78.4%), helped them work with people (85.5%), helped to develop job skills (64.3%), and made them aware of career possibilities (62.9%).

One hundred and five (7%) of the respondents indicated they had belonged to one or more other campus organizations including Agriculture Student Council, Agronomy-Soils Club, Alpha Gamma Rho, Alpha Zeta, Block and Bridle, and Gamma Sigma Delta. Thirty-nine (26%) of the respondents indicated that they belonged to "other" organizations.

DEMOGRAPHIC CHARACTERISTICS

Objective 2 was designed to identify the following demographic information regarding agricultural education graduates. There were 53 (35.1%) female respondents and 98 (64.9%) males. Ninety-seven (64.7%) were married while forty-two (28.%) were single. The remaining eleven (7.3%) were either separated, divorced, or widowed.

Fifty-eight (39.5%) of the graduates lived in towns or cities with populations less than 10,000. Thirty-one (21.1%) lived where the population is between 10,000 and 29,999, thirty-two (23.1%) lived where the population is between 30,000 and 100,000, and twenty-four (16.3%) lived in cities or towns of over 100,000.

Table 1
Graduates' Perceptions of the Quality of Advisement by the Agricultural Education Faculty

Type of Advisement	Quality of Advisement Frequency (f) and Percent (%)										Mean Response*
	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree		
	f	%	f	%	f	%	f	%	f	%	
Helped get courses needed	1	0.7	3	2.0	4	2.6	53	35.1	90	59.6	4.51
Helped get experience wanted in college	1	0.7	5	3.3	20	13.3	73	48.7	51	34.0	4.12
Well qualified to advise students	0	0.0	1	0.7	4	2.7	60	40.2	84	56.4	4.52
Readily available when needed	0	0.0	6	4.0	11	7.3	52	34.4	82	54.3	4.39
Friendly and cooperative	0	0.0	3	2.0	4	2.6	39	25.8	105	69.5	4.63
Made effort to become acquainted with my problem	1	0.7	7	4.7	16	10.7	56	37.3	70	46.6	4.25
Appeared happy to be of assistance	0	0.0	4	2.7	7	4.7	47	31.8	90	60.8	4.51
Provided information and assistance for further education	1	0.7	5	3.5	15	10.5	49	34.3	73	51.0	4.31
Provided information and assistance in getting a job	1	0.7	9	6.7	16	11.9	44	32.6	65	48.1	4.21

*Rating Scale: Strongly Disagree=1; Disagree=2; Undecided=3; Agree=4; and Strongly Agree=5.

Table 2
Graduates' Perceptions of the Teaching Behavior of the Agricultural Education Faculty

Type of Teaching Behavior	Quality of Teaching Behavior Frequency (f) and Percent (%)										Mean Response*
	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree		
	f	%	f	%	f	%	f	%	f	%	
Clarity in presentation	0	0.0	2	1.3	4	2.7	82	54.7	62	41.3	4.36
Used variety of teaching methods	0	0.0	10	6.7	4	2.7	62	41.3	74	49.3	4.33
Alert and enthusiastic about subject	0	0.0	3	2.0	8	5.3	65	43.0	75	49.7	4.40
Task oriented (stayed on subject)	0	0.0	1	0.7	3	2.0	75	50.0	71	47.3	4.44
Asked questions and used student ideas	0	0.0	4	2.7	11	7.3	68	45.0	68	45.0	4.32

*Rating Scale: Strongly Disagree=1; Disagree=2; Undecided=3; Agree=4; and Strongly Agree=5.

Sixty-nine (47.6%) of the respondents indicated they lived less than 49 miles from their hometown. Thirty-eight (26.2%) indicated they were between 50 and 149 miles from their hometown. The rest of the respondents were fairly evenly spread in each of the brackets from 150 to greater than 1,500 miles.

Forty-two (46.2%) indicated that their spouses were less than 49 miles from their hometown. Twenty-two (24.2%) indicated their spouses were between 50 and 199 miles from their hometown. Fifteen (16.5%) indicated their spouses were 1,000 miles or greater from their hometown, while 12 (13.2%) lived between 200-999 miles from their hometown.

PROFESSIONAL CHARACTERISTICS AND CAREER PATTERNS

Objective 3 was designed to identify information regarding professional characteristics and career patterns of agricultural education graduates. A total of one hundred (66.7%) respondents were employed as some type of teacher when surveyed; twenty-eight (18.6%) were formerly employed as vocational agricultural teachers while twenty-two (14.7%) had never taught vocational agriculture. Most of the respondents, one hundred and twelve (74.2%), indicated that their first job was as an agricultural education instructor. Twelve (7.9%) indicated their first job was in agribusiness. Eighty-nine (59.7%) of the respondents indicated they were currently employed as vocational agriculture teachers. Fifteen (10.1%) indicated they were employed in agribusiness. Ten (6.7%) indicated they were employed as non-agricultural instructors.

Fifty-one (34.2%) indicated they earned an undergraduate degree while forty-seven (31.5%) of the respondents indicated they had taken some graduate courses. Thirty-nine (26.3%) had earned a master's degree while eleven (7.4%) had earned a master's degree with additional graduate courses. One (0.6%) indicated earning a Ph.D.

For the 1986-1987 graduates, beginning salary ranges for teachers was between \$15,000-24,999. For the 1975-1985 graduates, forty-nine (39.8%) indicated current annual earnings between \$20,000-24,999, thirty-three (26.8%) indicated earning between \$15,000-19,999, sixteen (13%) indicated earning between \$25,000-29,999, five (4.1%) indicated earning below \$10,000, and five (4.1%) indicated earning greater than \$40,000. The 1975-1985 data included all graduates and represented current earnings in 1986.

Forty-seven (53.4%) indicated they were currently teaching in single teacher departments while forty-one (46.6%) indicated they were currently teaching in multi-teacher departments.

Thirty-five (38.9%) teachers indicated their length of contract was twelve months. Nineteen (21.1%) indicated their length of contract was ten months while nine (10.0%) indicated their contract was eleven months. Twenty-seven (30.0%) indicated their contract was other than 10, 11, or 12 months. Seventy-nine (87.8%) teachers indicated they did receive a salary supplement while eleven (12.2%) indicated they did not receive a salary supplement.

Those respondents who currently teach vocational agriculture indicated membership in professional organizations. Membership was highest in the Florida Vocational Agricultural Teachers Association with fifty-eight (71.6%). Forty-one respondents (50.6%) indicated membership in the Florida Vocational Association and thirty-nine (48.1%) in the National Vocational Agricultural Teachers Association.

This question was posed to the respondents: If it were possible to start college over, would you major in Agricultural Education? One hundred and seven (72.3%) indicated they would major in agricultural education if they were to start college over again. Thirty-three (22.3%) indicated they would not major in agricultural education and eight (5.4%) were undecided.

CONCLUSIONS

Based upon the findings of this study, the following conclusions were made:

1. Graduates perceived the adequacy of the coursework they received as between good to excellent in the areas of pre-professional studies, technical agriculture, and agricultural education.
2. Graduates rated the coursework received in agricultural education the highest, followed by technical agriculture coursework, and pre-professional coursework. Student teaching received the highest rating by the graduates.
3. Graduates believed that the amount of technical agriculture coursework received by agricultural education students should be increased while the amount of pre-professional and agricultural education coursework should be maintained at its present level.
4. Graduates perceived the quality of advisement and teaching by the faculty to be of very high quality.
5. Most graduates were members of the Agricultural Education Society. Participation in AES was perceived to be of value to the graduates.
6. Graduates tended to be male, married, living in small communities, teaching in single teacher vocational agriculture departments, living relatively close to their hometowns, and have or are completing educational coursework or degrees beyond the bachelor's degree level.
7. Most of the graduates indicated that they taught vocational agriculture after graduation and about two-thirds of the graduates are currently teachers in some field. Almost 60% are current vocational agriculture teachers.
8. Most graduates who were teaching vocational agriculture belonged to the FVATA and FAV. Most do not belong to NVATA and AVA.
9. Almost three quarters of the graduates would major in agricultural and extension education again, while about 5% were undecided.

RECOMMENDATIONS

Based on the findings and conclusions drawn from this study, the following recommendations are made:

1. This study should be used by faculty and administrators as they examine the effectiveness and quality of the teacher education program within the department.
2. Efforts should continue to be made to maintain the quality of teaching and advisement students receive in the department.
3. Data relative to career patterns and program perceptions should be collected annually and a formal analysis of these data conducted every three to five years.
4. The following specific recommendations are made to the department:
 - A. Continue seeking methods of increasing the technical agriculture requirement in the curriculum.
 - B. Continue to implement excellence in teaching and student advisement.

- C. Intensify efforts to increase involvement in the Agricultural Education Society.
- D. Continue to encourage students to continue their education through completing additional education coursework.
- E. Intensify efforts to promote the importance of professional organizations.

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ASSESSMENT OF THE PREPARATION AND CAREER PATTERNS
OF AGRICULTURAL EDUCATION GRADUATES, 1975-87

A Critique

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This follow-up study was aimed at graduates of the Agricultural Education Department at the University of Florida. Since university educators place so much emphasis on doing follow-up studies, it is certainly imperative that we follow-up our own graduates for the purpose of determining effectiveness and improving our programs.

The researchers appear to have followed proper procedures in developing and testing the instrument used in the study. Reliability for the various components of the questionnaire ranged from .74 to .96. Although the .74 is a little low, the reliability for the instrument was acceptable. The researchers were particularly diligent in their attempt to obtain data that would be representative of the population and followed through with a telephone sampling of the non-respondents. The research methodology was sound and the findings useable. The conclusions and recommendations were supported by the data.

I have a few suggestions that might strengthen the study. Given the time and space restrictions for the presentation, I would like to see the data presented as two studies -- one dealing with the perceptions of the graduates and one dealing with the demographics. By dividing the study, more time and space could be devoted to the implications of the findings. In particular, I would like to see a further discussion of the demographics and their impact on the program. Demographics of those who teach and are preparing to teach are different than those of a few years ago so more importance needs to be placed on the study of teacher and student demographics.

A separate summary of the perceptions of the graduates would also allow for the categorization of the responses by the year of graduation. A time span of 12 years could possibly be too long of an interval to group the responses. It should be interesting to compare the responses of the more experienced graduates with the responses of the less experienced.

In summary, I feel that these are three sound studies that make a contribution to the profession.

BELIEFS AND INTENTIONS OF COUNSELORS, PARENTS, AND STUDENTS REGARDING AGRICULTURE AS A CAREER CHOICE

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INTRODUCTION

Educational programs in agriculture are in direct competition with programs such as engineering, business and medicine which are judged by the public as being more glamorous and career-promising. As a result, talented young students are being counseled or attracted into such programs in pursuit of economic security and status.

In Illinois, agricultural education programs at the secondary level are experiencing enrollment declines. Data compiled by the Illinois Vocational Agricultural Teachers Association (Witt, 1987) and the Illinois Board of Higher Education (Databook on Illinois Higher Education, 1986) from 1977 to 1986, showed declining numbers as high as 54 and 22 percent, respectively, in student enrollment in agricultural programs. This trend of declining enrollments is contributing to a shortage in the available supply of individuals in the food and agricultural sciences. According to a USDA report (Coulter, et. al., 1986), our nation will likely face a 10 percent annual shortage of human capital through 1990.

RELATED LITERATURE

The conceptual framework for this study emphasized the necessity of studying beliefs, attitudes and intentions. Fishbein and Ajzen (1975) determined that intentions to participate in an activity could be predicted based on a person's knowledge, observations, or other information held about some issue or event. This suggested that the decisions of individuals to select or not to select agriculture as a field of study or to become actively engaged in agriculture may be predicted by examining their beliefs about agriculture.

Several investigators (Slocombe, 1986; Golladay & Wulfsberg, 1979; Holder, 1973) found family members, guidance counselors and peers as "significant others" in students' selection of an occupational program. Betts and Newcomb's study (1986) of urban students indicated that students perceived agriculture as science-oriented, however they lacked the knowledge of its importance as an industry and the career potential. The literature also sought to examine studies about the relationship between education, occupation, and background. Hicks (1976) found race was a major factor affecting guidance counselors' decisions regarding the selection of a field of study or career option related to agriculture.

PURPOSE AND OBJECTIVES

The purpose of this study was to examine the beliefs held about agriculture by guidance counselors, high school juniors, and their parents, and the relationship between these beliefs and the intentions of these groups to select or not to select agriculture as a career choice.

The objectives of this study were:

1. To determine the relationships between guidance counselors, parents, and high school juniors' beliefs about agriculture and their intentions to consider agriculture as a possible career choice, and the demographic characteristics: age, sex, ethnicity, community type, occupation, level of education, and background in agriculture.
2. To determine the differences among guidance counselors, parents and high school juniors' beliefs about agriculture and their intentions to consider agriculture as a career choice.
3. To determine the relationship between the beliefs of guidance counselors and parents and the intentions of students to consider agriculture as a career choice.

PROCEDURES

The target populations of this study consisted of guidance counselors, high school juniors and their parents, associated with the public high schools (N=695 schools) in the State of Illinois, during the 1987-88 school year. The individual school served as the sampling unit. Stratified random sampling was used to assign 50 schools in each of four categories based on size of community. The three sample groups were drawn from each of the following categories: schools located in areas with over 100,000 residents (large urban), 25,000 to 100,000 residents (medium urban), 2,500 to 24,999 residents (small urban), and less than 2,500 residents (rural). The Chicago Public Schools were not included in the study.

An introductory letter was mailed to the guidance directors of each selected school explaining the purpose of the study and requesting their cooperation in administering the questionnaire to a class of juniors and then to the parents of the participating juniors. Eighty-two schools participated in the study. Data were collected from 1041 (62.7% response) high school juniors, 712 (68.4 response) parents of the juniors, and 82 (100% response) guidance counselors.

The instrument used in this study consisted of a three part questionnaire which was specifically designed and field tested for this study. Part I of the survey instrument contained 15 statements describing beliefs about agriculture, Part II contained 4 statements to measure intentions to select or consider

agriculture as a career choice, and Part III consisted of demographic items.

The Beliefs About Agriculture scale was factor analyzed to determine the most internally consistent items for measuring respondents' beliefs. Squared multiple correlations were used as prior estimates of communality, with iterated principal axis factoring and promax rotation. A summary of the eigenvalues is provided in Table 1. The first three factors derived the three subscales: Agriculture As a Career, Academic Preparation, and Agriculture in Illinois. Reliability coefficients were computed using Cronbach's Alpha for the three subscales (.50 to .94), beliefs scale (.74 to .91), and for the intentions scale (.69 to .82).

Table 1

Summary of Eigenvalues from Factor Analysis

Extracted Factor[a]	Students (n=1041)		Parents (n=712)		Counselors (n= 82)	
	Eigen- Values	Propor- tion	Eigen- Values	Propor- tion	Eigen- Values	Propor- tion
1	5.46	.84	5.20	.80	9.80	.88
2	.63	.10	.74	.11	.88	.08
3	.44	.07	.58	.09	.44	.04

[a] Factor 1: Agriculture as a Career; Factor 2: Academic Preparation; Factor 3: Agriculture in Illinois.

ANALYSIS OF DATA

Descriptive statistics were used to summarize the demographic variables. The data for objective one were analyzed relative to sex, ethnicity, and community using multivariate (MANOVA) and univariate (ANOVA) statistics; occupation and education using an ANOVA; age using the t-test procedure; and background information using point-biserial correlations. Analysis of variance were used to analyze differences among the three groups relative to objective two, and a Pearson r for relationships in objective three. The alpha level was set at .05.

RESULTS

COUNSELOR, PARENT, AND STUDENT INFORMATION

Of the counselors responding 51% (42) were females and 49% (40) were males. The largest ethnic group was reported as being white (83%). Approximately 21% and 45% of the counselors indicated that they had some past coursework and/or related work experience in agriculture, respectively. Of the 1041 high school juniors who completed the survey, 54% (562) were females and 46% (479) were males. Seventy-nine percent of the juniors were white.

A small percentage of juniors indicated that they had taken a course in agriculture. In response to "future educational plans," 83% planned to continue their education beyond high school before taking a job. A total of 712 parents responded to the survey. Fifty one percent (51%) were males and 49% (351) were females. White parents comprised the largest ethnic group (80%). Parents listed their occupations as agricultural (11%), professional (28%), clerical (23%), service (20%) and other (16%). Forty-eight percent of parents reported having only a high school diploma and 41% held degrees beyond the high school level.

OBJECTIVE ONE

A MANOVA computed for the three beliefs subscales indicated overall effects were significant for group ($p < .01$) and sex ($p < .05$). Univariate analysis (ANOVA) in Table 2 showed that differences existed among each subscale for group and for sex in the Agriculture as a Career subscale. The overall group difference was explained by a significantly lower student group mean on each of the three subscales, than reported for parents and counselors. The overall sex difference was characterized by females having significantly ($p < .01$) higher means for the Agriculture as a Career subscale. On the other hand, male respondents' intentions to select agriculture were found to be significantly ($p < .05$) higher than were those for females. In addition, differences ($p < .05$ and $p < .01$) were found among community type and the interaction with group.

Table 2

Summary of p-values Resulting from ANOVA on the Three Derived Belief Subscales and the Beliefs About Agriculture Scale

	Subscales			Total
	1	2	3	
Group	.0001**	.0001**	.002**	.0001**
Sex	.01**	.14	.32	.04*
Ethnicity	.43	.59	.20	.85
Community Type	.01**	.12	.12	.02*
Group X Sex	.14	.52	.65	.36
Group X Ethnicity	.34	.47	.19	.28
Group X Community Type	.004**	.28	.01**	.02*

* $p < .05$. ** $p < .01$.

Note. Scales - 1: Agriculture as a Career; 2: Academic Preparation; 3: Agriculture in Illinois; Total: Beliefs About Agriculture.

Respondents from the large urban community type held significantly ($p < .05$) more favorable beliefs about agriculture as a career than did respondents from rural communities. The comparison of the community types and respondent group means re-

vealed a significant contrast among guidance counselors' beliefs. In the large urban type ($M = 3.69$) counselors were found to have been the most positive in their beliefs, however, they also had the least positive beliefs in the rural type ($M = 2.83$). On the other hand, respondents from rural communities indicated more favorable intentions to select agriculture as a career choice than did those of the urban community types.

The variable ethnicity was determined not to be a significant factor in beliefs or intentions about agriculture as a career choice. Scores for both white and minority respondents were virtually alike.

Parents holding masters degrees had significantly ($p < .05$) more positive beliefs and intentions about agriculture as a career choice than those parents without a college education.

The t-test procedure computed to determine significant differences among parents based on age indicated that younger-aged parents (below age 41) were overall more positive in their beliefs regarding agriculture as a career choice for their children based on their response to the Beliefs About Agriculture scale than were older-aged parents (above age 40). However, parents categorized as older-aged obtained significantly higher mean scores ($M = 3.30$) than younger-aged parents ($M = 3.17$) in response to questions regarding the nature of academic requirements needed to enter agriculture.

Exposure to coursework in agriculture appeared to have a positive impact on students' beliefs about agriculture (Table 3). Forty-two percent of the juniors responded to the survey as having taken agriculture coursework obtained a mean score above 4.0 (strong beliefs) as compared to 20% of those who had no previous coursework. Responses to the Intentions scale indicated positive reactions among students ($p < .01$), parents and counselors ($p < .01$) regarding the selection of agriculture as a career choice based on their exposure to coursework. (Table 3)

Table 3

Relationship Between Previous Coursework in Agriculture and the Beliefs and Intentions Scales

Beliefs About Agriculture Scale							
Type of Respondent	Coursework in Agriculture			No Coursework in Agriculture			Correlation Coefficient
	Number	Mean	S.D.	Number	Mean	S.D.	
Juniors	219	3.18	.80	822	3.05	.61	.30**
Parents	548	3.31	.67	164	3.23	.74	.09
Counselors	17	3.04	.78	65	3.27	.73	-.20*

Table 3 (continued)

Intentions to Select Agriculture							
Juniors	219	3.06	.80	822	2.03	.61	.30**
Parents	548	2.46	.67	164	2.33	.74	.13
Counselors	17	2.94	.78	65	2.50	.73	.30**

*p < .05. **p < .01.

The reporting of agricultural news by broadcast media, especially television news, appeared to be associated with the least favorable beliefs and intentions indicated by the three groups. Statistically significant negative correlations were found among students ($r = -.28$) and parents ($r = -.18$) beliefs scores, with a nonsignificant correlation among counselors ($r = -.07$). Responses to the intentions scale also indicated negative correlations between each group and broadcast media. Counselors held the most negative relationship ($r = -.34$; $p < .01$), followed by juniors ($r = -.19$; $p < .01$), and then parents ($r = -.09$).

OBJECTIVE TWO

An ANOVA was conducted to determine if group differences existed among the mean beliefs and intentions scores of student, parent, and counselor groups (see Table 2). The results of the analysis for beliefs revealed significant group differences ($p < .01$) with the mean response of the student group ($M = 3.04$) having been significantly lower than that reported for the parent group ($M = 3.30$) and the counselor group ($M = 3.19$). The analysis conducted for group differences for the Intentions scale revealed significant differences among the student-parent groups and the counselor-parent groups. The intentions mean for the parent group ($M = 1.86$) was significantly ($p < .05$) lower than that for the student group ($M = 2.46$). The parent group mean was also significantly lower than that for the counselor group ($M = 2.28$).

OBJECTIVE THREE

Objective three was to determine the relationship between counselors and parents' beliefs and students' intentions to select agriculture as a career choice. This relationship was tested by correlating the mean beliefs scores of parents and counselors with students' scores from the intentions scale. The school ($n = 82$) served as the sampling unit. Significant relationships are presented in Table 4.

The analysis shows a stronger relationship between counselors' beliefs and students' intentions, compared with the student-parent interaction. A especially strong relationship ($r = .63$; $p < .01$) was found between counselors and students for the Beliefs About Agriculture scale.

Table 4

Correlations of Beliefs Scores for Parents and Counselors With the Intentions Score of Juniors (n = 82 schools)

Survey Scales		Correlated with Intentions Scale Juniors
Agriculture as a Career	Parents	.19*
	Counselors	.47**
Academic Preparation	Parents	.15*
	Counselors	.41**
Agriculture in Illinois	Parents	.15*
	Counselors	.28**
Beliefs About Agriculture	Parents	.18*
	Counselors	.63**

*p < .05. **p < .01

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings the following conclusions were drawn:

1. The findings of this study point to signs for positive enrollment trends in agricultural programs in Illinois. These trends are predicted from the more positive beliefs and intentions indicated from the younger-aged parents, persons with formal education beyond high school, and from residents of large urban communities.

2. Those high school students who have been exposed to coursework in agriculture tend to hold a more favorable set of beliefs about the nature of agricultural careers and are more incline to consider agriculture as an area of study than those students without such exposure.

3. Guidance counselors located in large urban communities hold the more favorable beliefs about agriculture as a career for their students than other counselors, parents, and students from other rural and urban community types.

4. A relationship exists between parents and counselors' beliefs about agriculture and high school juniors' intentions to select it as a possible career option. Stronger relationships were found between counselors' beliefs and juniors' intentions.

Based on the findings and conclusions, the following recommendations were derived:

1. A basic careers class in agricultural science should be offered at the secondary level in every public school. The class should provide a clear picture of agriculture.

2. Studies should be conducted to better understand the relationship between media coverage of agricultural events and the attitudes, beliefs, and intentions formed by young people.

3. Studies should be conducted to examine the dynamics and implications of favorable beliefs and intentions in large urban communities.

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BELIEFS AND INTENTIONS OF COUNSELORS, PARENTS, AND STUDENTS
REGARDING AGRICULTURE AS A CAREER CHOICE

A Critique

Thomas L. Grady, University of Wisconsin-Madison--Discussant

The purpose of this study was to examine relationships of parents, counselors and students beliefs about careers in agriculture and intentions to enter such careers. The paper was well-organized and generally well-written with an appropriate use of tables to report findings, although I would suggest removing Table 1. I appreciate the researchers for approaching the complex phenomenon of career beliefs and intentions with a multivariate set of questions.

The study begins with the implication that the research would be guided by a conceptual framework of beliefs, attitudes, and intentions. The framework suggests the causal order and relationships of variables for individuals with respect to their personal beliefs and intentions. As the model is stated, it does not suggest how other individuals' beliefs will influence one's beliefs or intentions. The study, then, seemed to be concerned about individual student intentions to enter agricultural careers as a function of their beliefs about agriculture and agricultural careers. How, then, do the intentions of parents and counselors fit the framework? For example, how does the model suggest that parent and counselor beliefs and intents will be related to the students' beliefs and intents? If the researchers think it should, then it seems that a further elaboration and development of the model would have been helpful in the introduction.

Moreover, a further clarification of beliefs and intentions would help the reader understand what certain relationships suggest. For example, when examining objective two, intentions were found to be significantly different among parents, students and counselors. Were these intentions the same type of intentions? As stated in the study, they do not seem to be the same. This makes the comparisons questionable. A clarification of what is meant by these terms and what we expect the nature of the relationship to be would probably change the data analysis and interpretation.

If the framework suggested was intended to direct the study, then I would prefer to see hypotheses stating the nature and direction of the relationship among variables as suggested by the model, rather than objectives.

I found the overall methodology to be generally sound. However, I was confused about the number of schools included in the overall sample. I would like to know how many schools were reporting from each population area. Also, it was not clear whether the response rates mentioned were from the 82 schools or from the original group of 200. Also, I would suggest, that when computing scores for use in the data analysis that a principal components score be used for each scale. This procedure can factor out random error and yield a standardized score reflecting the weighted, linear combination of each item as it contributes to the overall score. Internal consistency coefficients could then be calculated using the eigenvalues of the principal components.

In my opinion, the conclusion and recommendations could more adequately make sense of numerous findings in the study. For example, what would the relationship between counselors' beliefs and students' intentions suggest? Did the model suggest that such a relationship should exist? I would like to see more discussion about what the findings say about the model. Do they confirm it, conflict with it, etc? In particular, I am not sure conclusion one and two are supported by this study. Also, conclusion three and four seem to be restatements of findings.

Overall, I am encouraged by the conceptual orientation toward the questions in this study. I think a more elaborate development of the model and concepts will give a real boost to the future contribution of this effort.

CHARACTERISTICS OF THE MEAT INDUSTRY IN THE YEAR 2000
WITH IMPLICATIONS FOR PROGRAM DEVELOPMENT
IN AGRICULTURAL EDUCATION

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INTRODUCTION

If educators are to prepare students to enter the society of the future as workers, then educational programs should be planned relative to the needs of these students upon graduation. Truly, educators must be futuristic in accessing the needs as they plan the curriculum that will be used to educate the workers for the twenty-first century. Not only must the curriculum be futuristic to meet the needs for tomorrow but it must include instruction in content of the future. Traditionally, information about the past, along with some knowledge of the present has been used as a base for planning. Today's information is often outdated by the time it is published and the skills being taught may not be applicable when the student enters the job market. The meat industry is an example of an area of agriculture that is changing at a very rapid pace. The industry is almost literally in a frenzy to see who can get ahead in technology. Yet, no research had been conducted as to the long range future of the meat industry. Vocational educators must use futuristic research as a means of keeping the meat curriculum current. This study utilized a futuristic means of research, the Delphi technique, which has been reported by many authors (Brown & Helmer, 1964; Cetron, 1969; Cyphert & Gant, 1970; Fisher, 1978; Flanders, 1988; Hill & Fowles, 1975; Reeves & Jauch, 1978; Sappe, 1984; Swanson, 1981; Uhl, 1983; Weatherman & Swenson, 1974; Welch & Watson, 1979; White, 1988; and others) for selection of curriculum content in meat course work in agricultural education.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine curriculum content for meat course work in agricultural education in the year 2000 based on predicted characteristics of the meat industry. Specific objectives were to: determine the future characteristics of the meat industry, ascertain if the Delphi technique could achieve a consensus among meats experts as to the profile of the meat industry in the year 2000, predict the training needs of the work force entering the meat industry in the 21st century, and determine if demographic differences in respondents affected item ratings.

PROCEDURES

This was a national study utilizing a modified Delphi technique. The panel of experts from the meat industry and from academia were nominated by their peers at an international meeting, the 41st Annual Reciprocal Meat Conference. The 31 experts who were nominated the most frequently were invited to participate in the study. All agreed to participate by returning the completed first-round questionnaire. The data gathering instrument, which consisted of 98 items on a Likert-type scale, was used in both rounds one and two. Items for the questionnaire were developed by an extensive review of the

current literature and through personal interviews. The instrument was reviewed for content and face validity by a seventeen-member panel who had expertise in research on meat, education, teacher education, and/or futures research. Respondents replied via mail to the two rounds of the modified Delphi instrument. Data collected in round one (including comments) were compiled and resubmitted to the 31 members of the panel of experts as a part of the round two instrument.

Figure 1. Affiliation, location and regional division of the panel of experts.



ANALYSIS OF DATA

Data analysis for this study consisted primarily of descriptive statistics, including means, standard deviations, medians, and interquartile ranges. The Pearson product-moment correlation coefficient and the Wilcoxon matched-pairs signed-rank test were used to measure stability between rounds. A composite score was calculated for each item by taking the sum of the Likert scale score for all respondents. Consensus was reached on an item if sixty percent of the respondents were in agreement and the answer fell within either the "agree" or "disagree" range.

RESULTS

The 31 members of the panel of experts were all males, ranging in age from 36 to 72 years with a mean of 50 years. Seven of the experts held management positions in industry or related support organizations. The remaining 24 experts were faculty and/or administrators of meat science at universities. Many of those in industry had been university faculty and many of the university faculty had worked in industry. All but two of those selected to the panel of experts had Ph.D. degrees.

All 31 panel members returned both round one and round two instruments. In addition the respondents made 811 comments on the various items.

A composite score was calculated on round two data for each item and used to rank the items in order of agreement. The highest ranked items dealt with animal welfare, product quality, consumer education, and convenience of preparation. The items ranked lowest (indicating disagreement) were concerned with problems of meeting demand for branded items, use of current but little used technology in the future, increasing lamb consumption, retention of livestock ownership by producers, and consumers shopping for generic protein sources.

Items were measured against two criteria to determine consensus. Twenty-five items (26%) did not meet the criteria for consensus. Of the 73 items on which consensus was reached, seven items (10%) were in the "disagree" range and 66 items (90%) were in the "agree" range.

The standard deviations and interquartile ranges indicated a tendency for movement toward consensus. In 94% of the cases, standard deviations tended to decrease around the mean and interquartile ranges tended to decrease from round one to two, becoming closer around the median.

Stability of the responses from round one to round two were measured using the Pearson product-moment correlations and the Wilcoxon matched-pairs signed-ranked test. The responses were found to be very stable on all 98 items (no significant change at the .01 alpha level) using Pearson product-moment correlations and 84 items (86%) did not change significantly using the Wilcoxon matched-pairs signed-rank test. These tests indicated that further rounds of the Delphi technique would be of little benefit.

Table 1

Report of Item Ranking by Composite Score on Round 2

Item Number	Statement	Composite Score	Rank Order
<u>Five Items of Greatest Agreement</u>			
47.	The livestock industry can expect increasing pressure from animal welfare groups.	149	1
28.	Food service operators in the 21st century will look for quality factors of food such as consistency, uniformity, and product value	147	2
42.	Senior citizens, demanding a versatile number of food offerings, will become extremely important consumer targets	146	3
32.	Consumers will consider nutrition in their food purchasing decisions but they will not buy a product more than once if its taste, smell, color, etc. are not acceptable.	146	4
49.	The better managed companies will make discretionary inspection work for them.	143	5
<u>Five Items of Greatest Disagreement</u>			
74.	The use of irradiation/sterilization of vacuum-packed meats will be used to extend shelf life at room temperature	74	94
10.	Animals will be slaughtered at one location and processed at another location; these may be by different companies	72	95
36.	Lamb consumption will increase due to improved marketing techniques such as better fabrication	70	96
3.	Producers will retain ownership of cattle throughout the cycle. In some cases this ownership will be extended to specified retail outlets.	67	97
46.	Consumers will shop for generic protein sources rather than specific meats such as beef, pork, chicken, turkey, fish, or other meats.	58	98

CONCLUSIONS

Use of the Delphi Technique

The Delphi technique may be efficiently used to determine consensus among the meat industry experts. These findings about the characteristics of the industry are essential to developing meat curriculum content for the future. Responses were stable from round one to round two. Therefore, it is highly unlikely that another round of the Delphi procedure would have shown significant changes in response.

Responses Based on Experts' Demographic Characteristics

There were no significant differences in the opinions' of the experts based on their geographic location, age, or education level.

Characteristics of the Meat Industry in the Year 2000

The following statements represent the meat industry of the future, according to the expert panel:

1. The meat industry will change rapidly in the future with more emphasis on automation technology.
2. Education will play an extremely important role in the meat industry, creating jobs in the consumer education field. Consumer education will begin in grade school to put into perspective the relationship of nutrients and hormones to our diet. Consumers will demand and be able to utilize nutritional information at the retail market and in restaurants. Retail meat merchandisers will spend more time with specialty items and consumer education and less time processing meat. The scientific and health care communities will require aggressive training and retraining based on accurate and detailed information to change consumer attitudes as to how red meat fits into diets.
3. Management of large, diversified companies will utilize a team approach.
4. Consumer demands will include: consistency, uniformity, less fat, lighter batters, product value, and nutritious products that are still pleasing to the organoleptic senses. The experts disagreed that consumers would shop for generic protein sources rather than specie specific or combined sources.
5. Packaging of meat products will consider the following: smaller single-service portions; and convenient, microwaveable, easy to open, aesthetically pleasing packages. More pre-packaged meat (fresh, pre-cooked and/or frozen) will be seen in the retail case utilizing technology similar to skin packaging. The success of pre-packaging systems will depend on the education of personnel in the distribution system.
6. Marketing strategies should consider target groups as opposed to the overall population, to stimulate sales.
7. Retailers will buy pre-trimmed meats in case-ready or in subprimal form. Many of these products will be pre-packaged, brand-identified, value-added products that may have been prepared at a central commissary.
8. Livestock producers must supply lean carcasses while maintaining excellent palatability traits. Cattle will be sold on a value-based system.
9. Research will continue into the 21st century in the following areas: molecular genetics to improve carcass composition, growth, and palatability; other biotechnology to improve fermentation processes, and to eliminate oxidative rancidity; and increased studies of consumer trends.

RECOMMENDATIONS

Agricultural education curricula for meat course work needs to be expanded beyond identifying retail cuts and placing carcasses in contest. The meat industry has become a technological giant requiring many job skills. Therefore, students in vocational education meat programs should be exposed to career opportunities and trade terminology. They should also be trained in using applied math, physics, and general science. Exercises in problem solving for management, production, economics, maintenance, scheduling, and quality assurance should be implemented. Students should be made aware of environmental safety, worker safety, and inspection requirements. Stimulating assignments should be developed using situations such as hypothetical product development from conception to consumer use.

The following content areas should be considered in developing or improving a meat curriculum for agricultural education:

- Product formulation and ingredients
- Use of the computer in formulation and inventory control
- Product selection based on dietary information and price
- Problems in yield determination
- Demographic survey techniques
- Principles of equipment maintenance
- Conversion of muscle to meat
- Meat quality factors
- Meat cookery
- Management approaches
- Quality control techniques
- Meat plant sanitation and its affects
- Problems associated with the central processing of meats
- Meat plant design
- Packaging principles and materials
- Product labeling
- Sensory evaluation of foods
- Meat marketing in a service-oriented society
- New marketing factors for livestock
- Job tasks in the meat industry
- Products and by-products of the meat industry
- Current trends and issues in meats
- Profile of a meat snack food

The following are suggestions for further study:

1. Further research should be conducted to more specifically determine futuristic trends in different segments of the meat industry (i.e. marketing, packaging, etc.).
2. A study should be conducted to relate present consumer beliefs about the nutritional value of meat to the actual facts.
3. A study should be made to determine industry acceptance of training and retraining programs at the post-secondary level, along with input from the industry as to course content to train future employees.
4. The voluminous comments collected from the panel of experts should be further analyzed in terms of the item ratings.
5. A replication of this study should be conducted every five years to see (a) how the future of the meat industry is then perceived, and (b) what changes have occurred in the meat industry.

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CHARACTERISTICS OF THE MEAT INDUSTRY IN THE
YEAR 2000 WITH IMPLICATIONS FOR PROGRAM
DEVELOPMENT IN AGRICULTURAL EDUCATION

A Critique

J. Dale Oliver, Virginia Tech--Discussant

This study addresses a major area of concern for curriculum development in agricultural education. The purpose and objectives of the study were clearly stated and the researchers used appropriate procedures to develop and validate an instrument and collect data for the study. I feel the results of the study will be useful in program development in agricultural education.

In my opinion, the report of the study could be improved with several clarifications. In the introduction, it would be helpful if citations were included to document the statements made in establishing a conceptual framework. Under procedures, the term "modified Delphi technique" should be defined. The scale used on the instrument is implied but not clearly defined. The data analysis involved the use of inferential statistics and it would be helpful if the basis for this was cited from the literature. Since the study included 98 items, it appears that 98 significance tests were conducted and the reader was not cautioned about the possible existence of the multiple comparisons problem. There was no conclusion relating to the objective to predict training needs of the work force. It appears that the training needs were included under the recommendations and it is unclear what procedure was followed in translating the industry characteristics into training needs.

I commend the researchers for exploring an important area of concern and feel the results will be useful in developing programs to prepare workers for the meat industry.

COGNITIVE LEVELS OF EDUCATIONAL PROGRAMS OFFERED BY THE COUNTY AGRICULTURAL EXTENSION AGENTS OF THE OHIO COOPERATIVE EXTENSION SERVICE

Ajay Bhardwaj and Larry E. Miller

INTRODUCTION

Extension educators have several roles to perform: change agent, facilitator, adult educator, and manager. Lately, the role of agent as educator has become more important than any other roles. The information explosion has influenced not only the information needs of the society but the delivery strategies of adult education as well. An increased demand exists for education that promotes decision-making capabilities, management abilities, and critical thinking. Yet the agent's role as educator is the one role most extension educators are least prepared to perform. Often, agents have been accused of merely disseminating information and not attempting to deliver decision-making abilities among their clientele. Astroth (1987) stated that in the immediate past, agents were rigorously trained to manage, supervise, organize, coordinate, plan, facilitate, and counsel, but not to teach. Therefore, added Astroth (1987) that the challenge today is to develop our expertise, not as mere disseminators, but as professional educators, who is able to design, deliver, and evaluate programs at higher levels of learning where decision-making capabilities and not only rote memory are promoted. Hence, a need to determine how learning was distributed across the levels of cognition was of exigent concern.

Many classification systems have been developed to classify the learning process. Bloom's Taxonomy (1956), which is widely acknowledged, suggested that cognitive learning can be classified into six levels; Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. In 1987, Newcomb and Trefz used a modified version of Bloom's Taxonomy in assessing the cognitive levels of questions used in examinations and student assignments in the College of Agriculture at The Ohio State University. The modified version has four levels; Remembering (R), Processing (P), Creating (C), and Evaluating (E) (Processing combines the Comprehension, Application, and Analysis levels of Bloom's Taxonomy). Their classification system was considered appropriate for the present study and was adopted.

PURPOSES AND OBJECTIVES

The study attempted to describe and explore cognitive levels of programs offered by the County Extension Agents of the OCES. Three research questions were addressed;

1. What is the attitude of selected county agricultural agents of the OCES toward a classification system of educational objectives?
2. At what cognitive level(s) of the system for classifying objectives developed by Newcomb & Trefz (1987), is the instruction offered by the county agricultural agents?
3. How do(es) the cognitive levels of instruction offered by the county agents vary with selected characteristics such as agent's age, work experience, support staff use etc.?

PROCEDURES

The study was conducted in Ohio. A purposeful sample of 20 county agents, ranked best agents by their supervisors, was selected for the study.

The study employed a mixed-method approach (both qualitative and quantitative methods) to answer the research questions. Two questionnaires, attitude and interview, were developed by the researcher to address the research questions. The attitude questionnaire had two parts. Part one measured the attitudes of

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the agents toward a classification system of educational objectives on a six-point Likert-type scale; part two gathered demographic information. The interview questionnaire consisted of nine open-ended questions developed to measure the cognitive levels of educational programs. The standardized format provided greater comparability of responses and the open-ended format offered depth in the responses (Patton, 1986). The face-to-face interviews were conducted on specific educational programs that the agents conducted in February or March, 1988.

Both the instruments were tested for content validity and reliability of the data. A panel of experts was used to establish the content validity. A Cronbach Alpha coefficient of .92 was established for the first part of the attitude questionnaire. The reliability of the interview data was established by checking the reliability of the coding scheme. The reliability coefficients for interview data ranged from .70 to .90 for all transcripts.

ANALYSIS OF DATA

Descriptive data analysis was performed on all three research questions. Since the data were collected from a sample chosen purposefully, no inferential statistics were considered necessary. The data for the research question one were analyzed with descriptive statistics. Means, frequencies, percentages were calculated for the data obtained through Attitude questionnaire.

The data for research question two, obtained by interviews, were analyzed with qualitative data analysis techniques (Miles and Huberman, 19886) and was completed in following steps:

1. Tape recordings of the interviews were transcribed with the help of a professional transcriber. The transcripts were checked for accuracy by the researcher.

Table 1

Cognitive Levels and their Assigned Numeric Value

Cognitive level	Numeric Value
Remembering (R)	1
Processing (P)	2
Creating (C)	3
Evaluating (E)	4
R+P	3
R+C	4
R+E	5
P+C	5
P+E	6
C+E	7
R+P+C	8
R+P+E	7
R+C+E	8
P+C+E	9
R+P+C+E	10

2. Transcribed information was categorized and coded by the researcher to organize the data for analysis. A different keyword was used for every category of information found usable.

3. The coding scheme was tested for reliability. One of the dissertation committee members of the researcher coded all odd numbered transcripts separately. A separate reliability coefficient was calculated for each transcript using the formula (Miles and Huberman, 1986):

$$\text{Reliability} = \text{Number of agreements} / \text{Total Number of coded information}$$

4. A microcomputer package, SUPERFILE, was used for loading the transcript excerpts on the computer. Use of this package allowed the information to be manipulated with various permutations and combinations to facilitate meaningful and accurate interpretation.

5. The coded information was analyzed to locate common themes emerging from the data. These emerging themes helped in classifying the cognitive levels of extension instruction. Once each program was classified into its cognitive level(s), numeric values of 1-15 were assigned in an ordinal fashion. The numeric values (Table 1) were generated for every possible combination of the cognitive levels of the Newcomb and Trefz (1987) system.

The data for the research question three were obtained via part two of the attitude questionnaire. Descriptive statistics were used to analyze the data. Appropriate correlation coefficients were determined on the basis of the level of measurement of the data gathered for the characteristics being correlated with the cognitive level being assessed, after confirming that the assumptions for the analysis were met.

RESULTS

The results of the study have been organized in three sections: attitudes of agents toward an educational objectives classification system, cognitive levels of educational programs of the OCES, and relationship of selected agent characteristics with their attitude toward an educational objectives classification system and the cognitive levels of their programs.

ATTITUDE OF AGENTS

On a six-point Likert-type scale (1=Strongly Disagree, 2=Disagree, 3= Slightly Disagree, 4=Slightly Agree, 5=Agree, and 6=Strongly Agree) the responses of the agents ranged from "slightly agree" to "agree" about the uses of an educational objectives classification system in offering extension educational programs. The agents agreed most regarding the usefulness of an educational objectives classification system for program evaluation ($\bar{X}=4.63$) followed by usefulness for program planning ($\bar{X}=4.35$), and for other general uses ($\bar{X}=4.34$) in carrying out an educational program. They agreed least ($\bar{X}=3.99$) about the benefits of a classification system for extension clientele. The standard deviations for each domain (Table 2) indicated that the agents did not differ greatly in their responses as they only ranged from .60 to .75.

Table 2

Attitudes of Agents toward the Uses of a Classification System

Domain	Mean	S.D
Uses in program planning	4.35	.71
Uses in Program evaluation	4.63	.61
Uses for clientele	3.99	.75
General uses	4.37	.60

COGNITIVE LEVELS OF THE EDUCATIONAL PROGRAMS OF THE OCES

Educational programs of the OCES can be placed into three categories: individual, small group, and mass, on the basis of the size of clientele group being addressed and media used. Traditionally, individuals have been offered programs year-round; small group programs have occurred during Fall and Winter months and mass programs have occurred during Spring and Summer months. This study has attempted to assess only the cognitive levels of small group extension educational programs.

The cognitive level analysis model included three criteria: the educational objectives, the questioning strategies, and the learning experiences provided through an educational program. The educational programs were assessed on all the three criteria, first separately and then in combination, across the four main levels of cognition).

The overall cognitive levels of the programs studied have been reported in Table 3. The twenty programs included in the study were each assigned numerical values with ordinal properties ranging from 1-10 (Table 1) and frequencies were counted for each category of cognitive level. Most of the programs (30%) were found to be at R+P level of cognition, followed by level R (25%). The cognitive levels P+E and R+P+E shared the third place with each accounting for 20% of the programs. The R+E level was represented least, only in one program.

Table 3

Cognitive Levels of the Programs

Cognitive Level	Numerical value	f	%
R	1	5	25
R+P	3	6	30
R+E	5	1	5
P+E	6	4	20
R+P+E	7	4	20

Further analysis of the interviews clearly pointed out problem with developing lesson plans and educational objectives. None of those interviewed developed a formal written lesson plan. At the most, the agents briefly outlined how they planned to conduct the educational program. However, all but one agent indicated a great need for lesson plans for educators. The most common reasons cited for not developing lesson plans were 'lack of time' and 'length of experience in teaching'.

The educational objectives were also not found to be formulated in terms of performance, end result or behavior, but rather as simple statements of what the agents needed to do in conducting the program. Again, all the agents agreed that educational objectives need to be formulated.

RELATIONSHIP OF SELECTED AGENT CHARACTERISTICS WITH THEIR ATTITUDE TOWARD THE USES OF CLASSIFICATION SYSTEM

The attitudes of the agents toward the uses of an educational objectives classification system were studied in relation to the cognitive levels of the programs conducted by the agents and some of the demographic and professional characteristics of the agents. Appropriate correlation

coefficients based on the level of measurement of the variables being correlated were first calculated separately for each domain of the attitude and then for overall attitude toward the uses of a classification system. The correlation coefficients have been reported in Table 4.

A low, positive Spearman rank-correlation coefficient ($r_s=.27$) was obtained between the attitudes of the agents toward the uses of an educational objectives classification system and the cognitive levels of the programs conducted by them. This meant that the agents having a more positive attitude toward a classification system had their educational programs at higher cognitive level and those having less positive attitude had their programs at lower levels of cognition.

The attitude of the agents showed a positive, moderate relationship with their age ($r_s=.35$) and length of service ($r_s=.47$) while a negative, moderate relationship with their use of resource persons ($r_s=-.34$). The attitude of the agents showed a negative, low relationship with their having additional responsibilities ($r_{pb}=-.14$) and major area of study in Masters ($r_{pb}=-.21$) while a positive, low relationship ($r_{pb}=.24$) with the program area being emphasized in their county. A negative, negligible relationship ($r_{pb}=-.09$) was found between attitude of agents and classification system being or not being part of their academic program.

Table 4

Relationships between Attitude of Agents toward the Uses of a Classification System and Selected Agent Characteristics

Selected Characteristics	Uses of a Classification System				
	General	Planning	Evaluation	Clients	Total
1. Cognitive levels of programs	.19	.54	.03	.30	.27
2. Program area emphasized	.25	.17	.49	.05	.24
3. Additional responsibilities	-.14	.01	-.34	-.12	-.14
4. Use of resource persons	-.29	-.37	-.34	-.21	-.34
5. Age of agent	.29	.40	.25	.28	.35
6. Length of service as agent	.45	.39	.41	.39	.47
7. Area of study in M.S.	-.08	-.23	-.45	-.08	-.21
8. Classification system as part of academic preparation	-.21	-.15	-.04	-.08	-.09

RELATIONSHIP OF SELECTED AGENT CHARACTERISTICS WITH COGNITIVE LEVELS OF PROGRAMS STUDIED

Appropriate correlation coefficients describing the relationship of certain characteristics with the cognitive levels of the programs have been reported in Table 5.

The age of the agents was found to have a positive moderate relationship ($r_s=.32$) with the cognitive levels of the programs. A negative negligible to low relationship was observed with program area being emphasized in the county ($r_{pb}=-.14$), use of resource person ($r_s=-.28$), and classification system being part of their academic preparation ($r_{pb}=-.23$). Additional responsibilities and major area of study in Masters exhibited a positive low relationship with the

cognitive levels of the programs. Length of service of agents exhibited a positive negligible relationship.

Table 5

Relationship between the Cognitive Levels of Programs and
Selected Characteristics

Selected Characteristics	Cognitive Levels
1. Program area emphasized	-.14
2. Additional responsibilities	.29
3. Use of resource person	-.28
4. Age of agent	.32
5. Length of service as agent	.09
6. Area of study in M.S.	.24
7. Classification system as part of academic preparation	-.23

CONCLUSIONS

The research problem of extension emphasizing the technology transfer and not the education of its clientele, was addressed by investigating a broader research topic of cognition in extension education. Two areas, attitude of the OCES agents toward the uses of an educational objective classification system and current levels of cognition of extension educational programs were studied by focusing on the attitude of agricultural agents and subsequently the cognition levels of agricultural industry programs of the OCES. .

The major conclusions regarding the attitude of the agents toward an educational objectives classification system are as follows.

1. In general, the agents have a positive attitudes toward the usefulness of a classification system in conducting an educational program. They perceived a classification system to be more useful for program evaluation than for program planning and least for extension clientele.

2. The agents having more positive attitudes toward the uses of an educational objectives classification system, specially in program planning, tend to offer their extension programs at higher cognitive levels.

3. The agents located in the counties emphasizing crop sciences related programs had less positive attitudes toward the uses of a classification system, especially in program evaluation, while the agents located in the counties emphasizing animal/dairy science related programs had more positive attitudes..

4. The agents who did not hold any other responsibilities, such as serving as a county chair or filling in as an agent for anther program area, tended to have more positive attitudes toward the uses of a classification system, specifically in program evaluation, while those having additional responsibilities were found to have less positive attitudes.

5. The agents who use more resource persons in their program tend to have less positive attitude toward the uses of a classification system, specifically in program evaluation.

6. The older agents tend to have more positive attitudes toward the uses of a classification system, specifically in program planning, than the younger agents

7. The agents having more experience as an agent tend to have more positive attitudes toward the uses of a classification system.

8. The agents with agricultural education background tend to have more positive attitude toward the uses of a classification system, especially in program evaluation, while, the agents having a background in agricultural economics, agronomy, or animal/dairy science tend to have less positive attitude toward the uses of a classification system.

9. Surprisingly, the agents having an educational objectives classification system as part of their academic preparation tend to have less positive attitude toward the uses of an educational objectives classification system as compared to those who did not have a classification system as part of their academic training.

The major conclusions regarding the cognitive levels of the OCES programs are as follows:

1. Contrary to the common belief that the extension programs are being offered at lower cognitive levels, such as remembering level of cognition, where only recall or rote memory is promoted, most of the extension programs were offered at a higher level of cognition, such as the processing level of cognition. The extension programs were also found to be offered at the evaluating level of cognition but not at the creating level.

2. The nature of the subject matter contained in the programs seemed to influence the cognitive level of the programs as the counties emphasizing crop sciences (including farm management) offered programs at higher cognitive levels than the counties which were emphasizing animal/dairy sciences.

3. Surprisingly, the agents having additional responsibilities were found to have less positive attitude toward the uses of a classification system but offered programs at higher cognitive levels

4. More use of resource persons by the agents in offering the programs tended to influence the cognitive levels of the programs negatively as the agents using more resource persons were found to be offering programs at lower cognitive levels

5. The older agents tended to offer programs at higher cognitive levels as compared to younger agents.

6. Similarly, more experienced agents tend to offer programs at higher cognitive levels in comparison to less experienced agents.

7. The agents with studies in agricultural education in their Master's program tended to offer programs at lower cognitive levels although they held more positive attitudes toward the uses of a classification system in carrying out an educational program, in comparison to the agents who had background in agricultural economics, agronomy, or animal and dairy sciences

8. The agents who had studied an educational objectives classification system as part of their academic preparation offered the extension educational program at lower levels of cognition than those who did not have a classification system as part of their academic preparation.

RECOMMENDATIONS

Based on the findings of the study and a review of literature on cognition in extension education, specific recommendations have been made for three major audiences -- the county agents, the OCES, and the Department of Agricultural Education.

THE AGENTS

1. The agents must familiarize themselves with the educational objectives classification systems, such as, Blooms Taxonomy or Newcomb and Trefz's adaptation of Blooms' taxonomy; and subsequently they should become a user of these systems in carrying out educational programs.

2. The agents need to improve their attitude toward the uses of educational objectives classification systems, specifically for clientele and program planning.

3. The agents should clearly define educational objectives, develop lesson plans, and evaluate their programs.

THE OCES

1. The OCES should encourage the use of educational objectives classification systems at all levels of administration in planning its educational programs.
2. In-service courses directed toward developing a better attitude regarding the usefulness of an educational objectives classification system in carrying out extension programs and giving the skills and knowledge necessary to use a classification system should be offered by the OCES for all agents, specially those with less experience and younger in age.
3. In-service courses are also highly recommended for teaching how to formulate educational objectives, develop lesson plans, and conduct evaluations of the programs.
4. The agents should not be asked to carry additional responsibilities, such as, being a county chair, as it was found to be negatively associated with the cognitive levels of the programs they offer.
5. The agent should be discouraged from the use of more resource persons or taught how to work with resource persons in conducting their programs as the use of resource persons was also found to be negatively associated with the cognitive levels of their programs.
6. The OCES should continually assess its programs in terms of their cognitive levels to ensure that it is offering the programs that would promote higher level thinking among its clientele.

THE DEPARTMENT OF AGRICULTURAL EDUCATION

1. The department should review its curriculum for the potential county agents because the study revealed that the agents with Agricultural Education background offered their programs at lower cognitive levels despite having more positive attitude toward a classification system.
2. The department of Agricultural Education, in its role of preparing future county extension agents, should emphasize the study of educational objectives classification systems and their use in carrying out educational programs.
3. The department should actively involve itself with the OCES in offering short courses on how to define objectives clearly, how to develop lesson plans, and how to evaluate programs?

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COGNITIVE LEVELS OF EDUCATIONAL PROGRAMS OFFERED BY
THE COUNTY AGRICULTURAL EXTENSION AGENTS
OF THE OHIO COOPERATIVE
EXTENSION SERVICE

A Critique

J. Dale Oliver, Virginia Tech--Discussant

This study addresses an important area of concern, especially as agricultural educators become increasingly involved in the preparation of agricultural extension agents. The authors have provided a conceptual framework which leads into a clearly stated problem. The study employed both qualitative and quantitative methods and provides an example of the complementary nature of the two approaches. Concerns about the content validity of the instrument and the reliability of the data were addressed and, since the sample was purposely selected, no inferential statistical techniques were used. The results of the analysis are clearly presented and the conclusions and recommendations are substantiated by the findings.

The concerns I have relate to the presentation of the research. It would be helpful to the reader to know the basis for the sample size, especially since this was a mixed method study. A "rule of thumb" appears to have been used in interpreting the magnitude of the correlation coefficients and it would be useful if the source of the rule was cited. In at least one instance a reference was cited in the text and which was not included in the reference list.

I commend the researchers on conducting a methodologically sound study which addresses a problem that is important to the profession.

THE COGNITIVE, PERCEPTUAL, AND INSTRUCTIONAL PREFERENCES OF AGRICULTURAL EDUCATION STUDENTS

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INTRODUCTION

The educational community has devoted considerable effort to assessing the effectiveness of various instructional methods and teaching strategies. Research on teaching effectiveness has been inconclusive in identifying a singular method of instruction that works well with all individuals. A growing body of research suggests students learn best when they are taught using methods that complement their preferred learning styles.

Thies (1979) defined learning style as a biologically and developmentally imposed set of personal characteristics that make a teaching method effective for some and ineffective for others. An instructional research model by Keefe and Monk (1988) viewed learning style as an umbrella term which encompasses cognitive, affective, and physiological/environmental dimensions.

The effect of the instructional environment to stimulate or inhibit learning for students with selected learning style characteristics is well documented (Dunn, 1987; Price, 1980). Correlational studies (Dunn, Cavanaugh, Eberle, & Zenhausern, 1982) revealed sets of traits among students within the same age or grade and among those with similar talents, achievements, and interest.

In addition to instructional environment, sensory preference influences the way students learn. Eight studies within the last decade revealed that when youngsters were taught with instructional resources that both matched and mismatched their preferred learning modalities, they achieved statistically higher test scores in modality-matched, rather than mismatched, treatments (Dunn, 1987). Children taught with multisensory resources through their most preferred modality and reinforced through their secondary or tertiary modality also had higher scores.

In four studies (Cholakakis, 1986; DeBello, 1985; Miles, 1987; and Perrin, 1984), students' sociological preferences were identified and instructional strategies were matched with their preferences. They achieved significantly higher test scores in matched conditions and significantly lower test scores when mismatched. Students' time preferences--morning "early birds" versus afternoon "night owls"--for learning also influenced achievement. Most students are not morning alert. At the elementary school level, approximately 28 percent appear to be "early birds." A majority (60%) of high school learners, on the other hand, remain most alert in the late morning and afternoon (Price, 1980).

As a result of research efforts in cognitive science (Larkin, McDermott, Simon & Simon, 1980; Newell & Simon, 1972; Simon, 1978) and education (Costa, 1985; Kirby, 1979; Sternberg & Caruso, 1985), much has been added to what is known about the development of human intellectual activity and processes. Thomas and Litowitz (1986) cited findings from research which showed there are individual differences within the common processes and functions associated with cognition. A youngster's cognitive skills will be influenced by his/her predispositions--learning styles--toward acquiring and processing information--learning and thinking.

Several contemporary experiments in the direct teaching of cognitive skills have yielded very positive results. Perkins and Salomon (1989) suggested guidelines available for classroom practices that foster the transfer of knowledge and skills. Most efforts to cultivate general cognitive skills have not focused on bringing together context-specific knowledge with general

strategic knowledge. Methodology and educational research should focus on intermingling generality and context-specificity in instruction. A limited amount of research has been conducted on learning styles of agricultural education students. Rollins (1988) and Cox, Sproles and Sproles (1988) profiled learning styles of secondary agriculture students and suggested important modes of learning and individual differences. They concluded that more research is needed to characterize and categorize learning styles.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to profile the preferred learning styles of ninth, tenth, eleventh, and twelfth grade students studying agricultural education in Pennsylvania. Specific objectives of the study were to describe:

1. Students' cognitive learning styles, i.e., their approach to processing information,
2. Students' perceptual learning styles, i.e., initial responses to verbal or auditory information.
3. Students' instructional preferences, i.e., the modality through which they prefer to receive instruction.

PROCEDURES

Population/Sample

Survey research methodology was used in this study. The target population for the study was all students enrolled in Pennsylvania Department of Education approved programs of agricultural education. The frame for this study included 201 agricultural education programs listed in the Directory for Vocational Education in Agriculture in Pennsylvania 1988-89. A stratified random sample of schools was used. Schools were stratified on the basis of geography and population density to reflect the diversity of Pennsylvania agricultural education programs. Sampling units were intact classes of ninth, tenth, eleventh, and twelfth grade agricultural education students (n=224). Ten schools were selected by the researchers to participate in the study from the fall of 1988 through spring 1989.

Instrumentation

The instrument used to collect the data for this study was the Learning Style Profile (LSP) developed by the National Association of Secondary School Principals. The Learning Style Profile consists of 23 subscales which provide data within three major areas--cognition, perceptual learning styles, and response to study and instructional environment modality. The LSP was developed in four phases from fall 1983 to early 1986 and is based on the work of noted cognitive psychologists Charles Letteri, Rita Dunn, and James Keefe. Appropriate testing was completed as the instrument was developed to establish both construct and concurrent validity. The average internal consistency reliability, as measured by Cronbach's Alpha for the 23 subscales, is .61 with a range from .47 to .76 for the 23 subscales. Although the reliability figures for the subscales are low, these reliabilities are acceptable for short tests intended to collect initial diagnostic information (Keefe & Monk, 1988). The researchers suspect that the low reliability figures are a function of the diversity of the national sample and that higher reliability coefficients would be obtained if the calculations were made on grades nine through twelve of the national sample. If the typical 5-item subscale on the Learning Style Profile were expanded to 15 similar items, the average reliability would be approximately .82. In addition to the data collected on the LSP instrument, general demographic information was collected via an instrument developed by the researchers.

Data Collection

Data for this study were collected from the November 1988 through March 1989. To insure consistency in the data collection process, all data for the study were collected by the researchers. The number of agricultural education students participating in the study was 224.

ANALYSIS OF DATA

The data were converted to standard scores as per procedures developed by the authors of the LSP and as described in the Learning Style Profile Technical Manual (Keefe & Monk, 1988). Data was analyzed with the Statistical Package for the Social Sciences (SPSS[®]2) at the Center for Academic Computing of The Pennsylvania State University. For the purposes of this paper, descriptive statistics were used.

Comparisons were made between the agricultural education students' results and the national sample's results. The national sample results are contained in the Learning Style Profile Technical Manual (Keefe & Monk, 1988). The national sample represents 5,000 students from grades nine through twelve. It was not possible to obtain the necessary detailed data from NASSP (National Association of Secondary School Principals) to conduct a t-test between the agricultural education sample and the national sample.

RESULTS

Students' Background

Of the 224 agricultural education students, 72 (32%) were females and 152 (68%) were males. The majority of students (98.2%) were white and ranged in age from 14 to 18 years old. By grade, the sample contained 14 ninth graders, 71 tenth graders, 57 eleventh graders, and 82 twelfth graders. Based upon state enrollment figures available for agricultural education, the authors are aware that the study sample underrepresents ninth graders and overrepresents twelfth graders.

The majority (87%) of the agricultural education students were members of the FFA and 61 percent indicated they were active or held positions of leadership in the organization. Fourteen percent had participated in FFA activities at the state or national level while 56 percent indicated their highest level of participation had been in their local chapter.

The largest percentage (23.9%) of 189 respondents who indicated they were employed in some capacity worked an average of 20 hours per week. Two-thirds (66%) of the respondents resided with both natural parents, more than one third (35%) were the oldest child in the family, and almost two-thirds (62%) had siblings.

Cognitive Learning Style

Data in Table 1 indicate that agricultural education students deviated by more than one point from the national norm on four of the five cognitive subscales: analytic, spatial, discrimination, and sequential. The ability to isolate the critical elements of a problem is measured by the analytic subscale which is composed of 5 items. Research (Keefe & Monk, 1988) shows that persons low in analytic skill have difficulty with certain problem-solving tasks. Persons high in this skill excel in mathematics and the sciences which require taking some critical element of a problem and using it in a different way. The spatial subscale, also composed of 5 items, measures a person's ability to identify a geometric shape, remember it, and discriminate it from other similar patterns.

Table 1
Means and Standard Deviations of Cognitive Subscales for Agricultural Education Students and the National Sample

Cognitive Subscale	<u>Ag Ed Students</u> n=224		<u>National Sample</u> n=5,000	
	Mean	S.D.	Mean	S.D.
Analytic	1.06	0.93	2.76	1.48
Spatial	1.34	0.96	2.83	1.43
Discrimination	1.40	0.97	3.08	1.38
Sequential	4.13	1.62	5.25	1.35
Memory	5.86	2.59	5.98	2.69

A considerable body of data suggests a relationship exists between this skill and success in technical courses (i.e., drafting) and related occupations. Discrimination skills, determined from 5 items on the subscale, are used to visualize important elements of a task and focus attention on required details. Agricultural education students would not be very efficient in attending to a task, would be distracted easily, and would be less successful at tasks requiring attention. The national sample would seem to have more attentional skills for tasks where alertness to details is important for accuracy. The sequential subscale is composed of 6 items measuring an individual's ability to process successive and simultaneous mental tasks. For example, students were to determine whether a series of geometric shapes are present or absent in a set of simple puzzles. Twelve items are used on the memory subscale to assess an individual's capability to retain an image of a complex figure long enough to make a judgment of whether it is the same or different in succeeding representations. Of the five cognitive subscales, the agricultural education students were most comparable to the national sample in this category. It should be noted, however, that both groups performed at a level of correctly answering less than 50 percent of the items.

Perceptual Learning Style

Table 2 shows the means and standard deviations of the agricultural education students and the national sample for perceptual responses. Three subscales--visual (15 items), auditory (15 items), and emotive (12 items)--measure the tendency of an individual to react to a series of words representing various concepts and objects in terms of visual, auditory, or kinesthetic modalities. Agricultural education students are more likely to process information through an auditory or emotive modality rather than a visual modality. On both auditory and emotive subscales, the students scored similarly to the national population. Agricultural education students process information in a manner similar to the manner students in the national sample process information.

Table 2
Means and Standard Deviations of Perceptual Responses-Initial Responses to Verbal Information for Agricultural Education Students and the National Sample

Perceptual Subscale	<u>Ag Ed Students</u> n=224		<u>National Sample</u> n=5,000	
	Mean	S.D.	Mean	S.D.
Visual Response	8.45	2.92	8.98	2.97
Auditory Response	4.63	2.33	4.33	2.44
Emotive Response	6.71	2.56	6.63	2.52

Instructional Preferences

Data in Table 3 present the means and standard deviations of agricultural education students and the national sample for orientations and preferences to study. The mean for the manipulative subscale, composed of a 4-item Likert scale, indicated that agricultural education students preferred "hands-on" instruction to a greater degree than the comparison sample. A lower mean score on grouping preference (5-item Likert scale) indicated that agriculture students preferred to learn in smaller groups than the national sample. Agricultural education students were only slightly more willing than the national sample to verbalize and state opinions (verbal risk subscale--4-item Likert scale) even if others disagreed. They also indicated less preference to receive instruction through verbal or spatial activities (6 items). The persistence orientation score (4-item Likert scale) indicated less willingness to work at a difficult task until completed or without adult supervision.

Table 3
Means and Standard Deviations of Orientations and Preferences to Study (Instructional Environment) for Agricultural Education Students and the National Sample.

Instructional Subscales	<u>Ag Ed Students</u> n=224		<u>National Sample</u> n=5,000	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
Persistence	12.67	3.02	12.99	2.79
Verbal Risk	12.59	2.79	12.44	3.00
Manipulative	14.02	2.79	12.64	3.25
Verbal/Spatial	3.14	1.36	3.49	1.69
Grouping	14.84	2.55	17.71	2.36

Data in Table 4 reveal that agricultural education students were very similar to the national sample in study time preferences (10 items). Almost identical preferences were indicated by the two groups for early morning and afternoon times. However, agricultural education students did not favor the late morning or evening as a study time as strongly as the national group.

Table 4
Means and Standard Deviations of Study Time Preferences for Agricultural Education Students and the National Sample

Study Time Preferences	<u>Ag Ed Students</u> n=224		<u>National Sample</u> n=5,000	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
Early Morning	5.59	1.90	5.65	1.69
Late Morning	5.33	2.11	6.00	1.83
Afternoon	9.92	2.07	9.94	1.95
Evening	8.61	2.64	9.07	2.58

CONCLUSIONS AND IMPLICATIONS

Based on the findings of this study, a distinct profile of Pennsylvania agricultural education students emerged. When compared to the national sample, agricultural education students have substantially less-developed skills in four of the cognitive areas measured in this study--analytical, spatial, discriminating, and sequential skills. Cognitive skills dealing with memory are comparable to the national norm.

When asked to respond to a variety of information, agricultural education students were inclined to initially process information by hearing it (auditory perception) and reacting with feeling (emotive perception). Agricultural education students did not prefer visual methods of learning as much as the national sample. Overall, these two groups were similar in their preferences for perceptual responses.

When considering instructional environments, agricultural education students preferred to learn in smaller-sized groups than the normed group. They also indicated a much stronger preference for learning via "hands-on" instruction and were only slightly more willing to express opinions, even if others disagreed. However, agricultural education students were not as likely to persist in a difficult task until completed and were less likely to prefer instruction emphasizing a high level of verbal and/or spatial activities.

This study provides another profile of the cognitive, perceptual, and instructional preferences of agricultural education students. Previous research (Rollins, 1988; Cox et. al, 1988) has documented similarities in learning styles and thinking skills of agricultural education students as well. This research raises complex questions related to the cognitive performance of students and the instructional processes used in agricultural education. The questions have serious implications for classroom teachers and teacher educators:

- Are agricultural education students inherently less able to perform cognitive skills?
- Are agricultural education students being taught psychomotor skills at the expense of cognitive skills? Are they "learning to do" at the expense of "learning to think?"
- Is the agricultural education curriculum cognitively challenging?
- Is the profession failing to develop a comprehensive curriculum because the students are unable to handle it?

As we continue our dialogue on redesigning agricultural curriculum to reflect our scientific base, should we ask ourselves:

- "Do these students have the basic thinking skills necessary to meet a science-based curriculum head-on?" ... Or "Is that why they are in agricultural education in the first place?"

RECOMMENDATIONS

This study provides insight into the cognitive, perceptual, and instructional preferences of students studying agricultural education and should be used to establish a benchmark for further investigation. As profiles of the learning styles of students enrolled in agricultural education become more visible through research, it is becoming increasingly evident that these students lack cognitive skills--the ability to think, solve problems, and effectively process information. Hence, the following recommendations are offered for further investigation and implementation:

- Classroom intervention strategies and methods to promote cognitive development--critical thinking, problem solving, and decision making--are needed, especially if a science-based curriculum for agricultural education is being proposed.

- Preservice education of teachers should include instruction in how to teach cognitive development--teaching students "how to think."

- Inservice education of classroom teachers should take advantage of proven methods and strategies of teaching thinking. Several models have been proven to increase the cognitive development of students.

Perhaps one key to better teaching is to make students better learners. Through the process of "teaching thinking," we can teach students how to become better learners.

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THE COGNITIVE, PERCEPTUAL, AND INSTRUCTIONAL PREFERENCES OF AGRICULTURAL EDUCATION STUDENTS

A Critique

Randol G. Waters, University of Tennessee--Discussant

The purpose of this study was to profile preferred learning styles of 9th, 10th, 11th, and 12th grade students studying agricultural education in Pennsylvania. Through a review of the literature, the authors build a theoretical basis for defining "learning style" as a composite of how students process information, how they initially respond to verbal or auditory information, and the "modality" through which they prefer to receive instruction. The authors are to be commended for the thorough review of literature which they present in support of their attempt to develop these profiles.

Having had an opportunity to read both the paper proposal and the final paper as it was presented here today, it appears that the researchers encountered some procedural difficulties which prevented them from being able to generalize their findings to all agricultural students in Pennsylvania as they had originally intended. However, their discussion of the findings from their study has posed some stimulating questions for agricultural educators to consider as revisions to high school curricula are contemplated. As with many such exploratory studies, many more questions have been raised than conclusions drawn.

Following are a few observations and suggestions the authors may wish to consider as they continue their research.

- Considering the original purpose of the study, it would seem more logical to report data by grade level rather than as summary data for all students. Data in the tables compare average "standardized" scores of all students in the sample to national norms.
- More evidence and discussion would be useful in support of their decision to standardize scores on the sub-scales prior to developing the Pennsylvania profiles. Although standardized scores may be useful for comparing **individual** scores to group norms, I am unsure of the logic of using them to establish group profiles.
- Considering the exploratory nature of the study, I would like to see a more detailed discussion and comparison of the findings from this study and the Iowa (Rollins) study. Were the Iowa students and the Pennsylvania students really that similar? How strong is the evidence which suggests that agricultural student learning styles are really different from those of other students?
- Finally, the instrumentation used in this study appears to merit further refining. Did the researchers develop any additional reliability data in support of the instrument? Although existing data may be acceptable for collecting "initial diagnostic information", internal consistency of some of the sub-scales should be higher before they are used to establish profiles for large groups of students.

In conclusion, this paper has presented a good overview of the literature related to the study of student learning styles. Further, it has provided evidence which suggests that agricultural education students may have considerably different learning styles than those used to establish the norms.

COLLEGE CURRICULUM COMPETENCIES AND SKILLS
NEEDED BY AGRICULTURAL EDUCATION MAJORS

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INTRODUCTION

Follow-up of program graduates has many purposes, not the least of which is to determine the adequacy of the educational program in preparing individuals for careers. Feedback regarding the value of competencies and skills can support their retention, revision or removal from the program (Wentling, 1980).

Identification of the placement and occupational success of graduates is a part of increased accountability and is necessary if meaningful evaluation of educational programs is to be completed. Follow-up studies of graduates, of both high school and college programs, has been one method employed to determine program relevance, employment history, and job stability (Byers, 1982; Langley, 1987; Riesenbergh and Tesnohldek-Mosham, 1987; and Good, 1987).

McGhee and Cheek (1988) completed a study of agricultural education graduates from the University of Florida "to assess their perceptions related to effectiveness of selected aspects of the program in agricultural education in preparing them for careers." (p.1) They stressed the importance of follow-up in providing decision makers with information about program effectiveness.

Information on the labor force experiences of those trained in Colleges of Agriculture is not readily available. What actually happens to agriculture graduates and what parts of the undergraduate curriculum are most valuable as they enter the work force are questions often left unanswered.

What knowledge and skills are most important in career success? Could student time have been more effectively channeled to provide strength in areas of importance? What competencies would have improved graduate's career experiences? These are questions that can only be answered by program graduates.

PURPOSE AND OBJECTIVES

In 1984, the CSRS Regional Research Project S-200 was instituted to determine the labor force experiences of persons who had been trained in Colleges of Agriculture. "This study (S-200) will provide baseline data on graduates of higher education in agriculture and their labor force entry. Also, it will provide data on the requirements for job performance in professional agricultural settings from the perspectives of both employees and employers" (S-200, 1984, P.1).

The information obtained from this study can be used by deans of instruction and agricultural education departments to enhance the education of future graduates by better preparing them with the skills currently needed in the labor force. The S-200 project was the vehicle used to gather the information on a regional basis.

The specific objectives of the study were: (1) to determine the requirements for job performance in professional agricultural settings, and (2) to determine graduates opinions about agricultural careers.

PROCEDURES

The CSRS S-200 study is a longitudinal study of College of Agriculture students in the 13 southern states which extends the CSRS S-114 project

completed in 1977. The S-114 study determined background characteristics and factors underlying career choices of students. A sample of 4480 students from both 1862 and 1890 land-grant institutions was involved.

The population for the study consisted of a 30% random sample of all agriculture students enrolled in 1862 land-grant Colleges of Agriculture in the south in 1977. Fifteen percent of the sample were from the S-114 project and the other 15% were from a parallel study by Crosby (1978) using the same frame. An attempt was made to locate both respondents and non-respondents from the original studies. Current addresses were obtained from Colleges of Agriculture and alumni records as well as through contact persons designated by respondents in 1977.

The instrument was developed by the members of the S-200 committee of state representatives. The instrument had five parts: (1) education attainment, (2) career mobility, (3) college curriculum competencies and skills, (4) opinions about agricultural careers, and (5) personal characteristics. Validation of the instrument was completed by the North Carolina A and T committee participant.

A mailed survey was conducted including three follow-up mailings. State representatives were responsible for location, mailing, cover letters and coding data for the states participating. Instruments were mailed to 2665 individuals, 2046 of whom responded. This represents a 77% response rate. The S-200 chair was responsible for developing the regional data set.

ANALYSIS OF DATA

Data on agricultural education majors were extracted from the regional data set. Descriptive statistics including frequencies, percentages and means were used due to the nature of the study.

FINDINGS

Findings reported will be based upon parts three and four of the instrument, College Curriculum Competencies and Skills and Opinions About Agricultural Careers, and will be limited to those 77 respondents who indicated agricultural education as a major at the time of graduation.

Most of the respondents graduated in 1981 or before. Thirty-nine of the respondents indicated that their first job was in the field of education, with 28 teaching vocational agriculture.

Respondents were asked to indicate if competencies and skills as well as knowledge elements from their undergraduate program were (1) "not needed," (2) "somewhat needed," (3) "much needed," or (4) "essential."

Those competencies and skills with the highest means were: (1) oral communication (mean = 3.41), (2) motivating and managing others (mean = 3.40), (3) using problem solving techniques (mean = 3.30), and (4) effective group leadership skills (mean = 3.20). Those indicated as least need were (14) computer skills (mean = 2.52) and (15) basic statistical techniques (mean = 2.23). (Table 1)

Knowledge elements with the five highest means were knowledge of: (1) efficient production in agriculture (mean = 2.89), (2) agricultural mechanics (mean = 2.74), (3) agricultural chemicals and their uses (mean = 2.71), (3) agricultural economics (mean = 2.71) and (5) agricultural production systems (mean = 2.69). Respondents indicated the five knowledge elements needed least were: (19) landscape design and selection of plant materials (mean 2.16), (20) U.S agricultural policy (mean = 2.08), (20) world food problems (mean = 2.08), (22) economically important forest resources (mean = 1.85), and (23) estimation of the quality of forest products on a site (mean = 1.70). (Table 2)

Agricultural education respondents were asked to express their opinions about agricultural careers on a four-point Likert-type scale from (1) "strongly disagree" to (4) "strongly agree". Sixty-three percent of respondents disagreed or strongly disagreed with the statement "Agriculture graduates lack awareness of issues facing agriculture." Eighty-seven percent disagreed or strongly disagreed with the statement "Most agricultural occupations are not suitable for women." Disagree or strongly disagree was the response given by 89% of respondents to the statement "Most people working in agriculture have incomes equal to persons in other industries."

Forty-seven percent of the respondents agreed or strongly agreed that agriculture was a declining industry, yet 71% agreed or strongly agreed that there were good career opportunities in the field. Agree or strongly agree was the response given by 71% of respondents on the item "There is lack of information about agricultural employment opportunities." "People in agriculture need more understanding of the ethics related to their work" received a response of 49% agree or strongly agree. "Most professionals in agriculture deserve to receive more recognition for their work than they do at present," received an agree or strongly agree response from 74% of the respondents. (Table 3)

CONCLUSIONS AND/OR RECOMMENDATIONS

Agricultural education majors responding indicated the greatest need for competencies and skills in the communications and people skills areas. This finding would reinforce the need for communications courses, both oral and written, and the pedagogical training in problem-solving and student management. Personal areas such as goal setting and time management should be reinforced or added to curricula in the major.

Knowledge areas indicated by respondents as needed were more general in nature and emphasized a production agriculture knowledge base. Traditional subject matter areas in vocational agriculture courses such as livestock and crops knowledge were rated as being needed more by the majority of respondents supporting the need for the technical agriculture component of the agricultural education curriculum.

A finding of concern was that a slight majority of the agricultural education graduates responding felt that agriculture is a declining industry. Also of concern is the discontentment apparent in the opinions expressed that agricultural professionals are not receiving the recognition they deserve and that their incomes are not equal to those in other industries.

There is a ray of hope in the finding that the majority expressed the opinion that there are good career opportunities in agriculture. However, this is tempered by the perception that there is a lack of information about those opportunities. Agricultural education departments should consider communication with graduates about the expanding career fields in agriculture. The expanding career fields of agriculture could also serve as a focal point for recruitment activities.

A comparison of agricultural education majors and other agriculture graduates on skills and competencies needed for career success is recommended. A comparison of the various majors' opinions about agriculture careers and their labor force experience could prove useful in recruitment activities.

A more in-depth follow-up of agricultural education graduates on a regional or national level would provide more complete information on competencies/skills and knowledge needed by program graduates for career success.

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Table 1

College Curriculum Competencies and Skills Needed in
Career Experiences (n=77)

Competencies:	Rank	Mean	SD
Skill in oral communication	1	3.41	.76
Skill in motivating and managing others	2	3.40	.74
Skill at using problem-solving techniques	3	3.30	.70
Skill in effective group leadership	4	3.20	.81
Skill in personal time management	5	3.19	.87
Skill in setting personal goals	6	3.14	.88
Skill in setting organizational goals and objectives	7	3.11	.85
Skill in written communication	8	3.07	.78
Skill in public speaking	9	3.03	.88
Skill in finance and cost management	10	2.89	.89
Skill in handling consumer/customer relations	11	2.86	1.05
Skill in negotiating employee/employer differences	12	2.85	1.05
Skill in project and/or program evaluation	13	2.80	.79
Skill in computer use	14	2.52	1.09
Skill in basic statistical techniques	15	2.23	.93

(1) not needed, (2) somewhat needed, (3) much needed, (4) essential

Table 2

Knowledge Elements Needed by Agricultural Education
Majors in Careers (n=77)

Knowledge Elements:	Rank	Mean	SD
efficient agricultural production	1	2.89	1.02
agricultural mechanics	2	2.74	.99
agricultural chemicals and uses of	3	2.71	.98
agricultural economics	3	2.71	.91
agricultural production systems	5	2.69	1.03
livestock/poultry breeds and characteristics	6	2.58	1.06
nutrient requirements for livestock and poultry	7	2.54	1.14
methods of controlling livestock/poultry diseases	8	2.53	1.13
plant nutrient requirements	8	2.53	1.04
set up farm record systems	10	2.51	1.08
interpret and use soil test results	11	2.49	1.06
characteristics of annual, biennial, and perennial plants	12	2.47	.99
identify agronomic crops	13	2.45	1.01
evaluate agricultural investment alternatives	14	2.38	.98
environmental effects of water management on water quality	15	2.33	.93

(1) not needed, (2) somewhat needed, (3) much needed, (4) essential

Table 2

Knowledge Elements Needed by Agricultural Education
Majors in Careers (n=77) (continued)

Knowledge Elements:	Rank	Mean	SD
calibrate planters and spraying equipment	16	2.30	1.06
micro-organism functions in soils	17	2.21	.93
natural resource property rights	18	2.18	.92
landscape design and selection of plant materials	19	2.16	.97
world food problems	20	2.08	.98
U.S. agricultural policy	20	2.08	.883
economically important forest resources	22	1.85	.91
estimate the quantity of forest products on a site	23	1.70	.92

(1) not needed, (2) somewhat needed, (3) much needed, (4) essential

Table 3

Opinions about Agricultural Careers (n=77)

Statements	Strongly Disagree	<u>Percent Response</u>		Strongly Agree	No Opinion
		Disagree	Agree		
Agriculture graduates lack awareness of issues facing agriculture	10.5	52.6	25.0	5.3	6.6
Most agricultural occupations are not suitable for women	28.9	57.9	9.2	0	3.9
There are good career opportunities in agriculture	6.6	21.1	51.3	19.3	1.3
People in agriculture need more understanding of the ethics related to their work	5.3	34.2	38.2	10.5	11.8
There is a lack of information about agricultural employment opportunities	2.6	15.8	39.5	31.6	10.5
Most people working in agriculture have incomes equal to persons in other industries	36.8	52.6	6.6	0	3.9
Most professionals in agriculture deserve to receive more recognition for their work than they do at present	2.6	10.5	43.4	31.6	11.8
Agriculture is a declining industry	11.8	32.9	30.3	17.1	7.9

COLLEGE CURRICULUM COMPETENCIES AND SKILLS
NEEDED BY AGRICULTURAL EDUCATION MAJORS

A Critique

Jerry L. Peters, Purdue University--Discussant

The research reported by Deeds and Hash was part of a much larger longitudinal study entitled; "CSRS Regional Research Project S-200". This research effort was designed to determine the requirements for job performance in professional agricultural settings and graduate opinions about agricultural careers by surveying agriculture students enrolled in 1862 land grant Colleges of Agriculture in 13 southern states in 1977.

Several important questions were raised by the researchers in the introduction section of the paper, however, these questions were not addressed in the study. It was difficult for the reader to tell if the specific objectives of the study were referring to the overall CSRS Regional Research Project S-200 or the smaller study conducted by the researchers.

The procedures section of the paper does not provide a clear distinction between the CSRS S-114 project completed in 1977 and the CSRS S-200 study. Exactly when did the researchers conduct their study? It was reported that "validation of the instrument was completed by the North Carolina A and T committee participant". Does this mean that only one person was responsible for validating the 5 part instrument? No mention was made in the paper if reliability coefficients were taken on the overall instrument or on each subpart.

What type of point scale was used to measure agricultural education majors opinions about agricultural careers? This was not made clear in Table 3.

What kind of generalizations can we make about teacher education programs when only 36% of the agricultural education graduates were teaching vocational agriculture?

It would have helped the paper if the tables had been reduced to allow more room for the researchers to provide a more thorough discussion of the results.

What implications do the results of this study have in relation to the National Research Council Report especially when we find the majority of respondents indicating efficient knowledge in agricultural production as essential and world food problems and U.S. agricultural policy as somewhat needed? It might have helped this reader understand the results of this study if demographic data such as age, sex, years of teaching experience, subjects taught, occupational status, etc. were collected and reported.

Based on the results of this study what are the college curriculum competencies and skills needed by Agricultural Education majors?

Recommendations for further research are included in the paper.

COMPARISON OF THE ACADEMIC PREPARATION AND PERFORMANCE IN
COLLEGE OF AGRICULTURAL EDUCATION MAJORS AND OTHER
AGRICULTURAL MAJORS

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INTRODUCTION

The 1980s has been a decade during which a multitude of concerns about public education has assumed high priority on the national agenda. One educational concern that has become a major issue is the competence and quality of teachers (Nelson, 1985). The National Commission on Excellence in Education (1983) found that many teachers came from the lower percentiles of graduating high school seniors. Sykes (1983) found that education tends to rank near the bottom of college majors on a variety of admission measures such as the SAT. Additionally, Sykes (1983) reported that Graduate Record Exam scores among education majors had declined significantly since 1970, National Teacher Examination scores had declined significantly from 1969-70 to 1974-75, and the cumulative grade point average for education majors ranked 12th out of 16 majors.

Of further interest are the findings of Vance and Schlechty (1982) that teachers who score highest on measures of academic ability are those most likely to leave the profession early and those who score the lowest are the most likely to stay in the classroom. Vance and Schlechty (1982) suggested that the lack of academic ability among preservice teachers results in poor public relations and consequently discourages competent people from entering teaching. Additionally, the perceived status and prestige of teacher education departments and colleges suffer due to the enrollment of these lower ability students. Crunkilton, Miller, and Lee (1986) found that departments of agricultural education needed to improve their image within colleges of agriculture.

This focus on the competence and quality of teachers in general raises the question among agricultural educators as to the academic ability of agricultural education majors. Are future teachers of agriculture coming from the ranks of the most competent high school graduates who enroll in colleges of agriculture, or are the most talented agriculture students seeking different career opportunities? How do agricultural education majors compare with other majors in colleges of agriculture? Wardlow (1986) found that agricultural education graduates at The Ohio State University from 1978 to 1983 did not significantly differ from other agricultural graduates on the following measures of academic ability: high school GPA, high school rank, cumulative college GPA, humanities GPA, social science GPA, content area GPA, and ACT scores.

PURPOSE AND OBJECTIVES

The purpose of this research was to determine if the academic ability and high school preparation of agricultural education majors differed from other majors in the College of Agriculture, and if the performance of agricultural education majors at the university was different than agricultural majors other than agricultural education. The research questions were as follows:

1. For all students in the sample, to what degree and how might the academic credentials students bring into the College of Agriculture (completion of a prescribed college preparatory curriculum as reflected by admission status¹, number of courses of vocational agriculture, high school class rank and ACT composite score) discriminate between agricultural education majors and agriculture majors other than agricultural education?
2. For students in the sample who had graduated, to what degree and how might the academic credentials students bring into the College of Agriculture (completion of a prescribed college preparatory curriculum as reflected by admission status, number of courses of vocational agriculture, high school class rank and ACT composite score) as well as the performance of the students in the university (hours of math, business, and technical agriculture, and final GPA) discriminate between agricultural education graduates and agriculture graduates other than agricultural education?

PROCEDURE AND ANALYSIS OF DATA

The study was descriptive-correlational. The sample was 501 students who began study as new first-quarter freshman in the Ohio State University College of Agriculture in the autumn quarters of 1981, 1982, and 1983. Data regarding the students' rank in high school graduating class, ACT composite score and high school courses completed were obtained from transcripts and other official documents. Data regarding admission status, courses completed at the university and grades earned in these courses were obtained from university transcripts.

Data were analyzed using discriminant analysis. The number of cases for some of the analyses is reduced since data for all variables were not available for all cases.

¹The prescribed college preparatory curriculum for unconditional admission to The Ohio State University is four units of English, three units of mathematics, two units of social science, two units of science, two units of foreign language, one unit of visual/performing arts, and one additional unit in any of the required subjects excluding visual/performing arts.

RESULTS

ALL STUDENTS

Univariate analyses indicated that the entering agricultural education majors and other agricultural majors differed significantly ($p < .05$) on the number of courses in high school vocational agriculture and admission status into the College of Agriculture. Agricultural education majors had taken a significantly higher number of courses of high school vocational agriculture. Conversely, there was a significantly higher percentage of agricultural majors other than agricultural education admitted into the College of Agriculture who had completed a prescribed college preparatory curriculum in high school. Twenty percent of agricultural majors other than agricultural education had completed a prescribed college preparatory curriculum while 8% of agricultural education majors had completed one. The two groups did not differ significantly on high school class rank or ACT composite scores (Table 1).

Table 1. Univariate F-Ratios, Means and Standard Deviations of Discriminating Variables for Total Sample

Discriminating Variable	Group		Univariate F-Ratio
	Ag Education (n=52)	Not Ag Education (n=387)	
Units High School Vo-Ag	3.75 (2.18)	1.94 (2.42)	26.24***
ACT Composite Score	20.12 (5.00)	20.96 (5.27)	1.63
Class Percentile Rank	76.83 (17.08)	72.76 (22.13)	1.19
Admission Status	.08 (.27)	.20 (.39)	4.72*

* $p < .05$. *** $p < .001$

Discriminant analysis was used to investigate the extent to which the academic credentials students have upon entry into the College of Agriculture discriminate between students who were agricultural education majors and students who were agricultural majors other than agricultural education. The discriminant function was statistically significant ($p < .001$) indicating that agricultural education majors can be distinguished from agricultural majors other than agricultural education by the set of variables included in the analysis (Table 2). The analysis revealed that units of high school vocational agriculture was the most powerful discriminating variable. Class rank percentile and ACT composite score were of lesser importance and whether a college preparatory curriculum was completed in high school

(admission status) was the least important variable in the set that discriminates agricultural education majors from other agricultural majors. The standardized discriminant function coefficients for units of high school vocational agriculture and class percentile rank indicated that high values for these two variables tend to be characteristics of agricultural education majors. The discriminant function resulted in 66% of the cases correctly classified. Therefore, classification based on the discriminating variables resulted in 33% fewer errors than would be expected by random classification.

Table 2. Summary Data for Discriminant Analysis for Total Sample (n=439)

Variables	Discriminant Function 1			
	b	s	Group Centroids	
Units High School Vo-Ag	.85	.94	Ag Ed	.708
ACT Composite Score	-.26	-.20	Not Ag Ed	-.095
Class Percentile Rank	.32	.23		
Admission Status	-.17	-.40		
<u>Eigenvalue</u>	<u>R_c</u>	<u>Wilks' Lambda</u>	<u>p</u>	
.068	.252	.937	<.001	

b = standardized discriminant function coefficient

s = within-groups structure coefficient

R_c = canonical correlation coefficient

STUDENTS WHO GRADUATED

Seventy-two percent of the sample had graduated or were still enrolled in good standing five years after entering the College of Agriculture. Eighty percent of the students in the sample who majored in agricultural education graduated while students who had majors other than agricultural education graduated at a rate of 71%.

Various measures of students' college academic performance (hours of technical agriculture, math, business, and final college GPA) were included with the high school academic credentials as possible discriminating variables in the analysis of students who graduated. Univariate analyses indicated that agricultural education graduates differed significantly ($p < .05$) from other agricultural graduates on units of high school vocational agriculture, hours of technical agriculture, hours of business, hours of mathematics in college, total college credits, and admission status. Agricultural graduates other than agricultural

education had a significantly higher number of hours in technical agriculture, mathematics, and business. Additionally, a significantly greater percentage of agricultural graduates other than agricultural education graduates had completed a prescribed college preparatory curriculum. Agricultural education graduates had significantly more units of vocational agriculture and total college credits than other agricultural graduates (Table 3).

Table 3. Univariate F-Ratios, Means and Standard Deviations of Discriminating Variables for Sample Who Graduated

Discriminating Variable	Group		Univariate F-Ratio
	Ag Education (n=43)	Not Ag Education (n=262)	
Units High School Vo-Ag	3.71 (2.18)	1.95 (2.32)	21.55**
Hours College Math	15.00 (4.78)	19.20 (6.23)	17.79**
Hours College Business	4.40 (3.75)	11.96 (12.79)	14.79**
Hours College Agriculture	53.33 (19.13)	78.44 (37.63)	18.34**
Total Credit Hours	204.00 (16.98)	197.04 (20.82)	4.33*
ACT Composite Score	20.60 (4.94)	21.88 (5.05)	2.37
High School Class Rank	79.09 (14.55)	76.88 (19.90)	.49
Final College GPA	2.74 (.44)	2.75 (.51)	.30
Admission Status	.07 (.28)	.22 (.41)	5.16*

* $p < .05$. ** $p < .001$

Discriminant analysis was used to determine if students' academic credentials upon entering college and subsequent academic performance in college discriminate between agricultural education graduates and agricultural graduates other than agricultural education. The discriminant function was statistically significant ($p < .001$) indicating that agricultural education graduates can be distinguished from agricultural graduates other than agricultural education by the set of variables included in the analysis (Table 4). The analysis indicated that hours of technical agriculture, hours of mathematics, hours of business, total credit hours in college, and number of courses of high school vocational agriculture were the most powerful discriminating variables. The standardized discriminant function coefficients for hours of technical agriculture, hours of mathematics, and hours of business indicated that higher values

for these variables tend to be characteristics of agricultural graduates other than agricultural education. The standardized discriminant function coefficients for number of courses of high school vocational agriculture and total college hours indicated that higher values for these factors tend to be attributes of agricultural education graduates. Final college GPA, admission status, class percentile rank, and ACT Composite scores were not particularly important variables in discriminating between the two groups. The discriminant function correctly classified 85% of the cases. As a result, classification based on the discriminating variables resulted in 71% fewer errors than would be expected by random classification.

Table 4. Summary Data for Discriminant Analysis for Sample who Graduated (n=305).

Variables	Discriminant Function 1		
	b	s	Group Centroids
Units High School Vo-Ag	-.53	-.42	Ag Ed -1.536
Hours College Math	.52	.39	Not Ag Ed .251
Hours College Business	.44	.36	
Hours College Agriculture	.71	.39	
Total Credit Hours	-.51	-.19	
ACT Composite Score	.21	.14	
High School Class Rank	-.07	.10	
Final College GPA	.14	.01	
Admission Status	.002	.21	
<u>Eigenvalue</u>	<u>R_c</u>	<u>Wilks' Lambda</u>	<u>p</u>
.388	.529	.721	<.001

b = standardized discriminant function coefficient

s = within-groups structure coefficient

R_c = canonical correlation coefficient

CONCLUSIONS

At the time of entering college, agricultural education majors can be discriminated from agricultural majors other than agricultural education by a set of variables describing the students' high school academic credentials -- whether a prescribed college preparatory curriculum was completed, ACT composite score, class rank, and number of units of vocational agriculture completed. The most powerful discriminating variable is number of units of vocational agriculture completed; more units of vocational agriculture completed is a characteristic of agricultural education majors. Agricultural education majors tend to have a somewhat higher high school class rank and agricultural

majors other than agricultural education tend to have slightly higher ACT composite scores. Whether a prescribed college preparatory curriculum was completed in high school is the least important variable in distinguishing the two groups of entering students.

At the time of graduation from college, final college grade point average, ACT composite score upon entering college, and rank in high school graduating class are not major variables that distinguish agricultural education graduates from agricultural graduates who are not majors in agricultural education. Major variables discriminating agricultural education graduates from other agricultural graduates are hours of technical agriculture, mathematics, and business completed in college; total number of credit hours completed in college; and number of units of vocational agriculture completed in high school. Agricultural education graduates tend to have completed a higher number of total credit hours in college and more units of vocational agriculture in high school. In contrast agricultural graduates who did not major in agricultural education tend to have completed more hours of technical agriculture, mathematics, and business in college.

Students who major in agricultural education, both upon entering college and at graduation, do not differ substantially from students who major in agriculture in areas other than agricultural education on variables that indicate academic ability and performance -- rank in high school graduating class, ACT composite score, and final college grade point average. The factor most important in distinguishing between the two groups is the pattern of high school and college courses completed by students. Agricultural education majors complete more units of vocational agriculture in high school. In view of the demonstrated negative relationship (Newman & Warmbrod, 1986; Raven & Warmbrod, in press; Warmbrod & Doerfert, 1987) between the number of units of vocational agriculture completed in high school and the number of college preparatory courses completed, agricultural education majors tend to enter college with fewer of the traditional college preparatory courses. However, the proportion of agricultural education majors who graduate is somewhat higher than the proportion of nonagricultural education majors who graduate. In college, agricultural education graduates take fewer courses in technical agriculture, business, and mathematics than nonagricultural education graduates. The number of professional teacher education courses completed by agricultural education graduates accounts for these college course pattern differences and for the finding that agricultural education graduates complete a higher number of total credit hours in college than do agricultural graduates who do not major in agricultural education.

The research does not support the contention cited early in the paper that students preparing to teach have less impressive academic credentials than students not pursuing a teacher

education curriculum. Agricultural education majors are just as academically competent as graduates in agriculture electing professions other than teaching. The consequences of differing patterns of course work completed both in high school and college by agricultural education graduates warrants further investigation in terms of competence for and performance as a teacher.

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COMPARISON OF THE ACADEMIC PREPARATION AND PERFORMANCE IN
COLLEGE OF AGRICULTURAL EDUCATION MAJORS AND OTHER
AGRICULTURAL MAJORS

A Critique

Jerry L. Peters, Purdue University--Discussant

Being able to ascertain the academic ability and strength of persons entering and preparing to become teachers of agriculture should be a primary concern of agricultural teacher education programs. The purpose of this study was to compare the academic preparation and performance of agricultural education majors with other agricultural majors. The researchers are to be commended for conducting an interesting and important study. It certainly has implications for maintaining or improving the image or status of agricultural education majors.

Strengths

1. The introduction is concise yet logically developed to provide a theoretical basis for the development of the research problem.
2. The purpose and objectives were clearly stated.
3. The summary data were presented in a concise manner, and statistical analysis techniques were appropriate, given the nature of the data and the objectives of the study.
4. The results were presented in a clear, concise manner with the use of detailed tables and accompanying narrative.
5. The conclusions and recommendations are clearly stated and are supported by the reported results.

The following ideas/questions are offered for the purpose of improving this paper and similar studies in the future.

1. The title of the paper indicates to this reader that The Ohio State University has a College of Agricultural Education. Would it be more appropriate to title the paper; "Comparison of the Academic Preparation and Performance of Agricultural Education Majors and Other Agricultural Majors in the College of Agriculture"?
2. Was demographic data, such as college major, collected on the other agricultural majors involved in the study? I raise this question because of the difference in hours of math and business courses completed. Why was it so much greater for the other agricultural majors?
3. In order to have a better understanding of the results it would have helped this reader if the discriminating variables; hours of college math and hours of college business were explained in more detail. What were the types of courses being taken in each of these areas?
4. Did the researchers consider looking at the number of hours of college science completed as a discriminating variable?

Once again the researchers are to be commended for an excellent study. The recommendation for further study in this area is a worthy suggestion.

A COMPARISON OF PERCEPTIONS OF SECONDARY AGRICULTURE TEACHERS,
SUPERINTENDENTS, PRINCIPALS, AND SCHOOL BOARD PRESIDENTS ON
BARRIERS WHICH MAY IMPEDE CHANGE IN SECONDARY AGRICULTURE
EDUCATION PROGRAMS

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INTRODUCTION

Data from the Nebraska State Department of Education show a nearly forty percent drop in enrollment in Nebraska's secondary agricultural education programs in the past ten years. The major emphasis of subject matter in local agricultural education instructional programs continues to be toward production agriculture/ranching. In a few schools, agriculture teachers have incorporated agribusiness subject matter into the local curriculum, necessitating the removal of production agriculture/ranching subject matter topics.

The traditions built in the past through successful local agricultural education programs are reflected through the local people who may be involved in policy making roles, such as the general public voters, and school board members. The expectations of the local policy making groups, which also include the school superintendent, principal, and the agriculture teacher, may be to continue the instructional program, FFA, and SAE as in the past, at the expense of lower enrollments and/or more non-agriculture classes taught by the agricultural education instructor.

Research completed by Selection Research, Inc. in Nebraska (1988) concluded that more emphasis should be placed on preparation of secondary agricultural education students for entry into agribusiness occupations. A recent national study of agricultural education in secondary schools conducted by the Committee on Agricultural Education in Secondary Schools, National Academy of Sciences (1988) concluded that the relevance and scope of the agriculture curriculum, supervised agriculture experience, and FFA must be broadened. The study pointed out that upgrading of programs should....

prepare students more for the study of agriculture in post secondary schools and colleges and for current and future career opportunities in agricultural sciences, agribusiness, marketing, management, and food production and processing. (National Academy of Sciences, 1988).

The National Academy of Sciences study pointed out that the dominance of production agriculture in the local agriculture curriculums must give way to a broader based local curriculum. The Selection Research, Inc. Nebraska study also strongly recommended that content about the social and economic significance of agriculture, and particularly its links to human nutrition, health, and environmental quality, be included in the K-12 curriculum.

An early step in achieving change in local agricultural education programs is to identify existing barriers which may impede change in existing programs. A review of recent literature on this topic provided valuable input for this study. Trusty (1985), in an address to the Annual meeting of the

American Association of School Administrators, listed significant barriers to school reform in the eighties. A 1985 Illinois study identified barriers to public involvement in school reform. Walters (1986) reviewed the societal influences that brought about changes in vocational education practice. Slaugh and Thomas (1985) studied the effects of environment and status of innovation on perceived barriers to change by business teachers. Lerner (1987), in a study of articulation between for-profit private occupational schools and secondary vocational programs/colleges and universities, identified issues and barriers that deter articulation.

Hensen (1986), in a paper on the philosophical approach to educational change, pointed out three barriers; that people resist change out of force of habit, out of fear, and out of hopelessness. Fardig (1985), conducted a study in Florida to identify and describe barriers to the implementation of competency based vocational education in secondary schools. His listing of 57 barrier statements, organized into 11 categories, formed a basis for the instrument used in this study. Statements were revised based on review of other studies, and adapted for agriculture/agribusiness education.

PURPOSE AND OBJECTIVES

The study was to compare the perceptions of superintendents, secondary principals, agriculture teachers, and school board presidents on barriers which may impede change in secondary school agricultural education programs.

PROCEDURES

A 57 statement instrument, organized into 11 categories, was reviewed by a jury of three agricultural education staff for content validity. The Florida study by Fardig, on which the instrument in this study is based, utilized an observational visit and personal interview procedure to obtain a basis for instrument reliability. Consensus of project staff was derived on the barriers statements based on visitation observations, recommendations by administrators and instructors in secondary schools visited, and recommendations by project staff. This author judged that the procedures outlined above provided a valid and reliable instrument for use in this study.

A random sample of 50 schools was selected from the 129 Nebraska secondary schools with agricultural education programs, or a 38.8 percent sample. Responses were received from 50 agriculture teachers, 49 superintendents, 48 principals, and 38 school board presidents.

A five point forced response scale of 1 strongly agree to 5, strongly disagree, was used for scoring each of the 57 barrier items.

ANALYSIS OF DATA

The data were analyzed using the SPSS-X package. An analysis of variance was computed to determine if significant differences existed among the 57 item means for the four groups, and for the 11 category means among the four groups. An alpha of .05 was used. In cases where significance was found, the Tukey-HSD procedure was used to denote pairs of groups significantly different at the .05 level.

RESULTS AND CONCLUSIONS

Table 1 shows the category mean for each of the 11 barrier categories, by respondent group. Significant differences were found among respondent groups in seven of the eleven categories. A score below 3.0 indicated a degree of agreement with the item, indicating the respondent perceived that item as a barrier to change.

Based on the group means for the 11 items in the "Administration category," Agriculture teachers believed that the school administration was a barrier to change. Agriculture teachers believed that school administration, superintendents, principals, and/or school board presidents know little about agribusiness education, express a negative attitude about agribusiness education, lack skills needed to develop daily routines which incorporate agribusiness education into secondary programs, are not willing to provide special resources and motivation needed to overcome faculty resistance to change, that agribusiness is beyond the resources of their schools, lack flexibility to accommodate agribusiness education in the present school setting, and will not provide the teacher released time during the school day to supervise agribusiness students. On the contrary, based on mean scores of items in the category, none of the other groups believed the above points were barriers.

Based on the group means for 14 items in the "Teacher category," no group believed that teachers were a barrier to change.

There was a difference, however, in the degree of perception for certain items. Agriculture teachers believed that secondary teachers have insufficient knowledge about agribusiness education or are misinformed about it, that teachers are not aware of opportunities to learn skills needed to implement agribusiness education, that teachers are not provided or do not utilize the planning time they need to develop or reorganize programs into an agribusiness course, and that teachers' collective bargaining agreements inhibit the planning and implementation required to establish agribusiness programs. School board presidents perceive that teachers believe that students with weak basic skills cannot succeed in agribusiness education.

Based on the group means for the 4 items in the "Support staff category," all four groups believed that the lack of school support staff is a barrier to change. Specifically, however, agriculture teachers differ from the other respondent groups in that they believe strongly that school personnel who are concerned with curriculum change are not the people who have the authority to effect change, that teachers have little access to clerical, media, and graphic arts assistance needed for agribusiness program development, and that school counselors are not well informed about agribusiness education and do not support students enrolling in such programs.

Agriculture teachers, principals, and school board presidents believed that secondary students were a minor barrier to change based on the group mean for the 3 items in the "Secondary students' category." The agriculture teacher believed that the need to accept mainstreamed special education students in job-preparatory programs creates difficulties in terms of instruction and program management.

Based on the group means for the six items in the "Physical resources category," all four groups believed that physical resources were a barrier to

change in agribusiness education programs. Agriculture teachers believed more strongly than superintendents that secondary schools find it difficult to obtain and support up-to-date equipment needed for agribusiness education. Based on the group means for the 7 items in the "Program operation category," all four groups believed that the program operation methods are barriers to change. Agriculture teachers believe more strongly than superintendents that agribusiness program designs require teachers to spend additional time and effort in student record keeping and reporting. Superintendents, however, believe more strongly than the other groups that secondary schools have time constraints that do not fit well with individual learning rates and students, therefore, may not be fully prepared for entry-level employment.

Based on the group means for the 2 items in the "School procedure category," all four groups believed that school procedures are barriers to change in agricultural education programs. Agriculture teachers believe more strongly than school board presidents that the way individual shops and laboratories are organized makes it difficult to schedule students and facilities needed in an agribusiness education environment.

Based on the group means for the 2 items in the "School climate category," all four groups believed the school climate is a barrier to change in agricultural education programs. Agriculture teachers believed more strongly than the other three groups that many secondary schools are oriented toward academic programs and thus it is difficult to get institutional support and resources for agribusiness education programs, and that school boards and school administration do not understand agribusiness education and are reluctant to modify policies and procedures to better meet the needs of agribusiness education.

Based on the group means for the 4 items in the "Teacher education category," agriculture teachers, superintendents, and principals believed that teacher education programs are a barrier to agribusiness education development. Agriculture teachers believed more strongly that teacher education programs do not adequately prepare vocational teacher for agribusiness in secondary schools, and that vocational teacher education programs do not discuss agribusiness education methods in their own programs. School board presidents did not perceive teacher education programs as a barrier to change.

Based on the group means for the 6 items in the "State education agency category," all four groups believed that the state education agencies are a barrier to change toward agribusiness education programs. All four respondent groups believed that Nebraska Department of Education (NDE) personnel are poorly informed about agribusiness education, communicate mixed messages to local schools about NDE commitment and direction relative to agribusiness education, that there is a lack of a comprehensive state agribusiness education implementation plan and policies, that few, if any, state provided financial and non-financial incentives exist to schools, administrators and faculty to implement and maintain agribusiness education, that new state teacher-assessment programs foster traditional expository teaching and ignore or hinder development of agribusiness education programs, and that teachers get little or no recognition for the kind of teaching they do in agribusiness education programs.

Based on the group means for the 2 items in the "Research and evaluation category," all four groups believed the research and evaluation base was a

barrier to change toward agribusiness education programs. They believed the data base of research and evaluation of agribusiness education is too small and there is too little evidence of the success of agribusiness education in Nebraska's secondary schools, and that local education agencies require demonstration of positive results before they move in the directions of agribusiness education.

Recommendations

1. That further research be conducted to identify how school districts within and outside Nebraska have confronted and solved perceived barriers to change toward agribusiness education programs.
2. That "change agent" procedures be identified from current literature, and evaluated for implementation in:
 - a. preservice vocational teacher education programs
 - b. graduate education programs for agricultural teachers, school administrators, and school counselors
 - c. in-service programs for agriculture teachers, school administrators, and counselors

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Table 1

Mean score for eleven "barrier to change" categories, by respondent group

Barrier Category	Respondent Group			
	Agriculture Teachers	Superintendents	Principals	School Board Presidents
School Administration	<u>2.717</u> - - - - -	<u>3.682</u>	3.515	3.364
Teachers	3.080	3.256	3.238	3.132
Support Staff	<u>2.167</u> - - - - -	<u>2.906</u>	2.872	2.955
Students	2.830	3.097	2.993	2.769
Physical Resources	<u>2.232</u> - - - - -	<u>2.604</u>	2.431	2.534
Program Operation	<u>2.666</u> - - - - -	<u>2.979</u>	2.841	2.771
School Procedures	<u>2.235</u> - - - - -	<u>2.447</u> - - - - -	<u>2.413</u> - - - - -	<u>2.718</u>
School Climate	<u>2.049</u> - - - - -	<u>2.898</u>	2.903	2.637
Teacher Education	<u>2.603</u> - - - - -	<u>2.989</u> - - - - -	<u>2.837</u> - - - - -	<u>3.013</u>
State Education Agencies	2.557	2.625	2.719	2.544
Research and Evaluation Base	2.402	2.646	2.467	2.566

a. Respondent groups scores connected by dashed line are significantly different at .05 level, based on the Tukey-HSD Test.

b. Response scale: 1 = strongly agree to 5 = strongly disagree.

A COMPARISON OF PERCEPTIONS OF SECONDARY AGRICULTURE TEACHERS,
SUPERINTENDENTS, PRINCIPALS, AND SCHOOL BOARD PRESIDENTS ON
BARRIERS WHICH MAY IMPEDE CHANGE IN SECONDARY AGRICULTURE
EDUCATION PROGRAMS

A Critique

Glen C. Shinn, Clemson University -- Discussant

The author inferred change was needed because of a drop in enrollment and a shift from production to agribusiness. Perhaps other factors should also have been considered: (1) Was secondary agricultural education meeting the felt needs of the student? (2) Was a decline in Nebraska school population an important factor shaping change? The problem was clear and important to the profession. The study asked one question; What were the perceptions on barriers which may impede change?

I commend the author for going outside the discipline to review related research, but would encourage a stronger tie between the problem and theory-based literature. Using 1988 APA convention, the "bibliography" was not adequate since it did not "cite works for background or for further readings" (p. 111). Too, I was concerned the paper omitted three citations from the listing: Selection Research (1988), National Academy of Sciences (1988), Illinois study (1985).

The procedures related to selection of subjects, instrumentation, and research design were clearly stated. A mail questionnaire was implied but not explicit. The reported percentage response was very good from each group. The results were clearly presented and important items within each category were identified. The results were explicit. However, the conclusions were nested in the results section. From my view, the conclusion section was the weakest part of the paper. It would have been beneficial if the conclusions were in a separate section.

I left with several unanswered questions: (1) What did you conclude when teacher scores were lower than all other groups except School Board Presidents on the barrier categories of students and state education agencies? (2) What sources of information and communications shaped respondent group perceptions? (3) What about experiences in program change, and how much change had occurred among the respondents? (4) What are the implications of a very small variance among respondents? (5) Why were teachers significantly different on seven of the eleven categories? (6) Why do all four respondent groups believe teachers are not a barrier to change? There was space left in the paper to deal with these concerns.

Two recommendations could have well been made before conducting the study. There is a need to know how perceptions are shaped and if they are based on reality. How do perceptions change? Can we go beyond this initial assessment and become positive change agents?

COMPUTER ANXIETY LEVELS OF SOUTHERN REGION
COOPERATIVE EXTENSION AGENTS

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INTRODUCTION

The advent of computers into the Cooperative Extension System (CES) has created a state in agents' lives that has been termed "computer anxiety." Oetting (1983) defined computer anxiety as "the anxiety that people feel they will experience when they are interacting with computers--the anxiety associated with the concept of computers" (p. 1). Maurer and Simonson (1984) had a similar definition, "the irrational fear or apprehension felt by an individual when using computers or when considering the possibility of computer utilization" (p. 2).

Computer anxiety levels of Extension professionals are an important consideration in the process of incorporating computers into their daily routine. Further adoption of computer technology must be handled carefully if anticipated computer anxiety is to be reduced.

The introduction of computers into most, if not all, aspects of the CES seems to have created mixed reactions. Studies dealing with Extension personnel suggest that computers are being used on an increasing scale (Baker, 1985; Cantrell, 1982; Richardson, 1984). Computer anxiety of Extension agents was a concern in at least two of these studies (Cantrell, 1982; Baker, 1985).

The literature shows that computer anxiety in varying degrees, rather than the expected math anxiety, is being experienced. Just as the learning of mathematics has been affected by math anxiety, it is very likely that computer anxiety affects both choosing to learn about computers and the mastery of computer skills (Oetting, 1983). Cantrell (1982) was one researcher who termed the anxiety associated with use of computers as "computerphobia."

Oetting (1983) has shown that levels of computer anxiety can be assessed by using a computer anxiety scale, COMPAS. These studies showed there is a relationship between computer anxiety and math anxiety.

Worden (1984) used COMPAS to conduct a national survey of "extension workers involved in home economics programming" (p. 1) from the four CES regions and the District of Columbia home economics staff. Of these, 20 respondents were state home economics leaders. The results showed that 36% of the participants were generally comfortable with computers. Worden used COMPAS in an effort to assess attitudes even though it had been developed to measure computer anxiety.

Bellando and Winer (1985) determined there was some validity to classifying people according to "Holland types" in an effort to determine computer anxiety. They reported that Holland's artistic and social types revealed significantly higher computer anxiety as measured by COMPAS than the other types--realistic, investigative, conventional, and enterprising.

With the introduction of computers into the lives of Extension professional staff members, mixed reactions and behaviors have resulted. Maurer and Simonson (1984) listed some behaviors that are associated with acceptance of computer technology: avoidance of computers and the area in which they are located, excessive caution, negative remarks, and attempts to cut short the necessary use of computers.

Another problem associated with computer technology is employee acceptance. The literature shows that the use of computers will increase; however, the path to employee acceptance will not be easy (Richardson, 1984).

SIGNIFICANCE OF THE STUDY

Since the early 1980s, the number of computers in county/parish Extension offices within the Southern Region has increased dramatically. In 1985 and 1986 CES showed growth and progress in technology adoption. These results were surprising because 1986 was a year of budget and personnel cuts (Travieso, Dik, Russo, & Curtin, 1987).

As a result of recent dramatic increases in the number of computers and Extension personnel being expected to use them, it is possible that computer anxiety is being experienced by many in Extension. This state, computer anxiety, may result in the agents choosing not to learn about or use computers and may affect their mastery level of computer skills (Campbell, 1986).

The study of computer anxiety is a new research area. Computer anxiety among educators has been investigated in few studies. No comprehensive study addressing computer anxiety of Extension agents had been conducted on a regional or national scale. Only one limited study with home economics professionals focused on attitudes.

A study of computer anxiety was needed to provide knowledge about factors that may impact on the agents' readiness to use computers. This information will allow Extension administrators an opportunity to improve the effectiveness of computer skills training. In addition, with more Extension personnel being afforded the opportunity to develop their computer skills, it was important to determine if agents were experiencing computer anxiety so that, if needed, appropriate educational interventions could be implemented. For these reasons, it was imperative to determine Extension professionals' level of computer anxiety.

PURPOSE AND OBJECTIVES

The purpose of this study was to measure computer anxiety of Extension county/parish agents within the CES Southern Region. The objectives were to:

1. Determine the computer anxiety levels of Extension agents as measured by Oetting's Computer Anxiety Scale (COMPAS).

2. Describe agents concerning: (a) their level of computer use and current computer skill levels; (b) the availability and use of an office computer; (c) the amount and type of formal computer training completed; and (d) their perceptions of administrative support for computer use.

3. Determine the amount of variance in the Extension agents' computer anxiety levels that could be explained by selected variables: level of education, years of Extension employment, age, gender, perceived typing skills, computer skill level, hours of weekly computer use, formal computer training, county/parish administrative support, area or district administrative support, state administrative support, and perceived mathematical ability.

PROCEDURES

Instrumentation

The instrument used to gather data was a two-part questionnaire: Oetting's Computer Anxiety Scale (COMPAS) and a closed-form question section designed to obtain information about the agents and their computer usage.

The long form of COMPAS contains 48 five point Likert-type items with seven subscales (hand calculator, trust, general attitude, data entry, word processing, business operations, and computer science). The overall computer anxiety scale range was 40 to 200. The respective ranges and classification were 40-79, very relaxed/confident; 80-104, generally relaxed/comfortable; 105-129, some mild anxiety present; 130-149, anxious/tense; and 150-200, very anxious. The subscales had a range of 4 to 20. The numerical ranges were different because there were only four items in each subscale. The ranges and categories were: 4-8, very relaxed/confident; 9-10, generally relaxed/comfortable; 11-12, some mild anxiety present; 13-14, anxious/tense; and 15-20, very anxious (Oetting, 1983).

The correlation between COMPAS and various types of test anxieties showed that computer anxiety is highly related to test anxiety ($r = .70$) when using a computer to take a test. Oetting showed that COMPAS and math anxiety had a moderately high correlation ($r = .40$). Based on these correlation coefficients, Oetting concluded that computer anxiety and math anxiety appeared to be related; however, COMPAS does not purport to measure math anxiety.

Oetting stated there are three types of anxieties: trait, state, and concept-specific anxiety. Oetting defined trait anxiety as "anxiety experienced by a person over the entire range of life experiences. State anxiety...is an anxiety that a person is experiencing right now, at this time" (p. 1). Concept-specific anxieties, on which COMPAS is based, "fill the...range between general trait anxiety and state anxiety. They are the anxieties that people associate with specific situations" (P. 1).

COMPAS was reviewed by psychologists, Benjamin Kleinmuntz and Steven Wise. Even though Kleinmuntz questioned the importance of measuring computer anxiety, both reviewers indicated that if one wishes to measure computer anxiety, COMPAS is the test to use (Mental Measurements Yearbook, 1985).

Using Cronbach's alpha, Oetting (1983) showed the overall internal consistency reliability as $r = .96$ for the long form. With the same formula, a reliability of .97 resulted from this study. The subscale reliabilities were similar--.71 to .86 in Oetting's study and .70 to .87 in this study.

Content validity of the instrument was evaluated by university Vocational Education faculty, Extension and Vocational Education doctoral students and a graduate advisory committee. The instrument was field tested with two agents who were randomly selected from each of the 13 Southern Region states.

Population and Sample

The target population was the county/parish level agents in the Southern Region of the CES. Extension agents with district/area or state administrative responsibilities were excluded. The accessible population included 11 of the 13 states within the Region: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. When contacted via letter and a follow up telephone call, the directors in two states, Kentucky and North Carolina, did not wish to have their agents participate.

Questionnaires were mailed to a systematic random sample of 544 agents drawn from personnel lists secured from Extension directors in the 11 accessible states. Of the 544 questionnaires mailed, 532 (97.8%) were returned after two mailings and two post card follow ups. Of the returns, 522 (96.0%) questionnaires were usable. Because of the high response rate, a planned telephone follow up of nonrespondents was not conducted since a 97.8% response rate was considered adequate (Borg & Gall, 1983).

ANALYSIS OF DATA

The alpha level was set at .05 a priori. Descriptive statistics were used to describe the data relative to computer anxiety level, demographic information, and computer usage. Correlation coefficients were calculated between computer anxiety and each independent variable. Stepwise multiple regression (Borg & Gall, 1983) was used to determine the amount of variance in the agents' computer anxiety levels that could be explained by selected variables.

RESULTS

Objective 1

The scores for the COMPAS scale and subscales are presented in Table 1. The COMPAS score for the sample was 110.86 ($SD = 32.47$). This score is higher than the level reported in other studies: college students, 109.8 (Bellando & Winer, 1985); vocational teachers, 104.4 (Kotrlik & Smith, 1988); and Extension home economists, 92.6 (Worden, 1984). The distribution of scores suggests that some of the agents may be experiencing some computer anxiety. The COMPAS manual indicates that "some mild anxiety" was present in college students commencing at a score of 105 on the overall scale. Almost 55% of the agents indicated they were experiencing some computer anxiety.

Table 1 summarizes the COMPAS scores for the sample. Anxiety scores on three subscales showed fewer than one-fourth of the agents experienced anxiety with a hand calculator, trust of computers, and general attitude toward computers. Fewer than one-half of the respondents indicated they were anxious with data entry, word processing, and business operations work. More than three-fourths (77.04%) of the agents revealed that they experienced anxiety with the computer science subscale section activities.

Objective 2

Over two-thirds of the agents responded that they use a computer. More than one-third of these agents think of themselves as novices. No agents considered themselves very knowledgeable. Almost 85% of the respondents indicated they had an office computer available to use. Of the available computers, over one-third (35.68%) were in a central office. Only eight percent (37) of the agents had a computer in their personal office.

Over 41% of the agents revealed they did not use an office computer even though they had access to one. Agents with a computer in their personal office reported using it almost 6 1/2 hours weekly, whereas agents who did not have a computer in their personal office used it about 1 3/4 hours each week.

Two-thirds of the agents had completed some type of formal computer training. The most reported type was an in-service training workshop. Ninety percent of the agents had participated in this type of activity. Almost half of the responding agents had completed more than eight clock hours of classes.

Agents perceived their administrators at the county/parish, area or district, and state levels to be supportive of computer use with state administrators being perceived as most supportive.

Table 1

COMPAS Scores for Extension Agents

Scale	<u>M</u>	<u>SD</u>	% experiencing anxiety ^a
Overall computer anxiety ^b	110.86	32.47	54.98
Subscales ^c :			
Hand calculator	5.51	2.33	4.22
Trust	6.76	3.11	12.45
General attitude	8.36	3.44	24.33
Data entry	10.08	3.98	43.49
Word processing	9.61	4.00	40.04
Business operations	10.07	4.13	41.95
Computer science	13.85	4.01	77.40

NOTE. N = 522.

^aThe percentages in this column were derived from comparing the agents scores to the COMPAS manual. ^bRange = 40-200. The ranges and categories for the overall computer anxiety scale were: 40-79, very relaxed/confident; 80-104, generally relaxed/comfortable; 105-129, some mild anxiety present; 130-149, anxious/tense; and 150-200, very anxious (Oetting, 1983). ^cRange = 4-20. The ranges and categories for the subscales were: 4-8, very relaxed/confident; 9-10, generally relaxed/comfortable; 11-12, some mild anxiety present; 13-14, anxious/tense; and 15-20, very anxious (Oetting, 1983).

Objective 3

Correlation coefficients for variables used in the regression analysis were calculated and interpreted using the set of descriptors by Hinkle, Wiersma and Jurs (1979). Moderate correlation (-.556) was found between computer anxiety and computer skill level. A low correlation (-.433) existed between computer anxiety and hours of computer use per week. Little, if any correlation was found between computer anxiety and the other variables.

Table 2 displays the results of the multiple regression analysis. Computer skill level was the best predictor of computer anxiety. Considered alone, this variable explained 31% of the variance in the overall COMPAS score.

Three other variables (perceived typing skills, perceived mathematical ability, and hours of computer use per week) explained an additional 6% of the variance. Agents with no or low levels of computer skills, agents who indicated they had poor typing skills, agents who perceived they had low math ability, and

agents who did not use a computer or used a computer fewer than four hours weekly, were more likely to have higher computer anxiety scores.

Even though all 12 variables included in the stepwise multiple regression analysis were based on research or a theoretical/conceptual framework, only four variables accounted for a significant proportion of the variance.

Table 2

Multiple Regression Analysis of COMPAS Scores (N = 456)

Source of variation	<u>SS</u>	<u>df</u>	<u>MS</u>	F-ratio	Prob. of F
Regression	176960	4	44240	66.5	.0001
Residual	300450	451	666		
Total	477410	455	44906		

Variables in the equation

Variables	<u>R²</u>	<u>Cum. R²</u>	<u>F</u>	Prob. of F
Computer skill level	.309	.309	203.3	.0001
Perceived typing skills	.022	.331	112.1	.0001
Perceived mathematical ability	.020	.351	81.6	.0001
Hours of computer use per week	.019	.370	66.4	.0001

Variables not in the equation

Variables	<u>t</u>	Sign. <u>t</u>
Level of education	-1.068	.2859
Years of employment with CES	1.767	.0779
Age	0.506	.6130
Sex	-0.086	.9312
Formal computer training	-0.654	.5136
County/parish administrative support	-1.270	.2047
Area or district administrative support	-0.770	.4419
State administrative support	0.551	.5820

CONCLUSIONS

Extension agents are experiencing mild computer anxiety; however, it does not appear that they are experiencing higher than normal computer anxiety levels. County/parish field agents are experiencing much higher levels of anxiety than state and national home economics personnel. More agents are experiencing anxiety with computer science functions than when involved with other subscale related activities.

The most common location for office computers is in a central office. Some agents do not use an office computer even though they have access to one. Agents with a computer located in their personal office use it more than the agents who do not have a computer in their personal office.

Many agents have completed some type of formal computer training even though minimal. The most frequent type was in-service training workshop(s). The majority of agents perceived they have administrative support for computer use at all levels.

Four variables: computer skill level, perceived typing skills, perceived mathematical ability, and hours of computer use per week explained a substantial proportion of the variance in agents' overall COMPAS scores.

RECOMMENDATIONS AND IMPLICATIONS

Extension administrators should provide agents with more opportunities to use computers. Relief time should be available for learning to use computers. Hiring agents with computer expertise would be advantageous.

Formal training in Extension sponsored computer classes or college courses should be afforded agents. Administrators at all levels should devise incentives that would encourage agents to use computers.

Additional computer related assistance should be made available by state computer specialists. These state staff professionals should be provided to consult with local agents in computer sessions in the agents' office using the computer equipment with which the agents work daily.

Administrative support should be continued and strengthened. Efforts should be made to enhance the perception of administrative support among Extension agents. Administrators should demonstrate their support of computer use by rewarding agents with tangible rewards and written and verbal praise.

The four significant explanatory variables of computer anxiety should be considered and incorporated into the planning for agent training and in-service activities. This action by itself holds the most realistic promise for reducing computer anxiety levels of Cooperative Extension System agents.

Additional research should be conducted to identify other variables that relate or contribute to the computer anxiety levels of CES agents. Similar studies should be conducted in the other four regions of the CES or nationally.

The regression model developed here may be a suitable foundation on which to develop activities to alleviate computer anxiety; however, additional research is needed to further investigate computer anxiety. When other variables are identified, an improved understanding of computer anxiety will enable administrators and state specialists to provide additional remedies.

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COMPUTER ANXIETY LEVELS OF SOUTHERN REGION
COOPERATIVE EXTENSION AGENTS

A Critique

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Extension agents are finding computers to be an increasingly important part of the workplace. As Extension professionals move through the process of incorporating computers into their daily routine, the authors believe that computer anxiety levels are an important consideration.

This was a study of extension agents in eleven states with a sample size of 456. What was the total population?

The authors are to be commended for using and field testing an already developed instrument, Doetting's COMPAS, with a high reliability rating. In fact, the reliabilities were so high, .97 and .98, that one wonders if the items were almost identical.

The scale in the instrument is not clear. It is stated that the instrument used a five point Likert type scale, which would lead one to expect the means and standard deviations would be somewhere between one and five. Yet the reported figures ranged from 40 to 200 for the overall scale and 4 to 20 for the subscales.

The multiple regression analysis was an appropriate one for this study. Four of the twelve variables accounted significantly (α equals .05) for the variance. It was found that computer skill explained about thirty percent. Time on the computer plus math skill and typing skill explained another one percent. This left approximately two-thirds of the variance not explained. The authors needed to strengthen their discussion of what did not explain anxiety, such as age, sex, and administrative support.

The recommendations were based on the findings and were complete and clear. One needs to be questioned: the recommendation to include all four of the explanatory variables into planning for agent training and in-service activities when only one, computer skill, accounted for more than one percent of the variance.

Finally, the assumption in this paper was that it is necessary for everyone to use computers. What is meant by use? Does this mean to type on computers and/or to develop computer programs? Or does this mean knowing enough about them to be able to delegate their use to others? Perhaps what is needed is training for office assistants in the actual use of computers and training for county agents in how computers can and should be used in educational programs and office management.

AN ETHNOGRAPHIC APPROACH TO ASSESSING EXCELLENCE
IN AGRICULTURAL EDUCATION

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INTRODUCTION

A declining student pool, rural to urban shifts, a negative image of agriculture, and the excellence movement in education have all been attributed to declining enrollments in secondary agricultural education programs. Overall enrollments in agricultural education have declined during the past decade and many high schools have eliminated programs. Survival of agricultural education is a topic among many in the profession. However, some high school agriculture programs are not only surviving, but are increasing their enrollments.

The practical question is, "What makes good agricultural education programs?" Addressing this question leads one to the question of what makes good education and vocational education. A 1985 study by Copa, et al., made the case that vocational education contributes to general education through such endeavors as building competence, applying basic skills, thinking through problems, exploring life roles, and expressing self. Atwood (cited in Magisos, et al., 1984) suggested that essential to "excellent" vocational programs are students who are ready to learn, motivated teachers with high morale, technical expertise and teaching skills, learning environments which simulate the work place, and a strong tie to industry to provide experiential components.

The "excellence movement" in education has identified the importance of several criteria associated with effectiveness such as (from Raiche, 1983): the social structural characteristics of schools, including a clear set of values, goals and expectations, competent administrative and instructional leadership, and strong parental commitment to educational goals; effective teachers; and promoting achievement in basic skills, higher order thinking and reasoning, psychological development, social skill development, and vocational preparation. Wayson, et al, (1988) noted, "The staff in 'excellent' schools create a positive climate that communicates to students that they are wanted and can succeed... (They) ...create ways to involve students in the life of the school."

Given the excellence research on schools, one can speculate that excellent agricultural education programs emulate many of the factors noted. However, it appears that little research has been done to evaluate excellent agricultural education programs on a holistic basis as a means of verifying this speculation.

PURPOSE AND OBJECTIVE

This study sought to identify factors unique to agricultural education programs which are identified as "successful." Specifically, this study sought to describe differences between four highly successful programs of agricultural education and four programs which were identified as "experiencing difficulties."

PROCEDURES

A danger in positivistic (quantitative) research designs is that they may yield only numerical ratings on predetermined factors. Thus, in positivistic designs, one risks overlooking very important and previously unidentified factors. Since this study sought to identify factors which may or may not be within conventional educational excellence paradigms, such as personological variables, an anthropologic design was used. Ethnography, a form of interpretive (qualitative) research, supplemented by focus group interviews, was selected as the appropriate procedure.

"Ethnography is the art and science of describing a group or culture," according to Fetterman (1989). He notes that ethnography seeks to describe the predictable patterns of thought and behavior of a group of people. These are patterns which are common across, but unique to, the group. Dobbert (1982) wrote that ethnographic research requires that the research scientist possess a degree of knowledge about the phenomenon since the researcher is the primary instrument for data collection. The researcher must not only be objective in data collection (as in positivistic designs), but must also account for an intersubjectivity between researcher and subjects.

In ethnographic research, reliability is not a concern in the positivistic sense. Reliability is a function of the expertise and objectivity of the researchers. Ethnographers contend that all researchers, both quantitative and qualitative, begin with preconceived biases which affect their research. The biases of quantitative researchers affect the framing and the approach of their studies; the biases of ethnographers enrich and provide perspective for their studies. Generalizability is seldom considered since the purpose of ethnographic research is to describe a particular sociological phenomenon within the setting of the study and which may not represent any other.

For this study, four schools experiencing enrollment difficulties in their agricultural education programs were self-selected for inclusion. These schools initially approached the researchers to assist them in identifying specific areas for improvement. An additional four schools with successful agricultural education programs were identified through a panel which included teacher education, state supervision, and leaders in the teaching profession. No criteria for determining "successful" programs was given to panel members to ensure that the underlying purpose of the study (to identify characteristics) would not be invalidated.

The research team consisted of four individuals who had each previously taught secondary agricultural education within the past seven years, but who were currently only indirectly involved in secondary agricultural education. Each of these research team members had experience and/or training in

objective observation and intersubjective analysis.

All members of the research team observed each school. Focus group interviews (Krueger, 1988) were conducted with a random sample of students enrolled in agricultural education and with a random sample of students not enrolled in agricultural education in each school. Interviews were conducted with the agriculture instructors and the principals in each school. Observations were made of the school climate through unobtrusive measures such as observing the social and physical environment.

ANALYSIS OF DATA

Interviews were recorded and later transcribed into written form. Following each school observation, lengthy "post-observation" sessions between the research team members were held to synthesize the important findings. The team sought to identify factors which were common across, but unique to, successful programs in contrast to the programs experiencing difficulties. These factors were organized into themes.

RESULTS

Several characteristics distinguished the successful programs from the other programs. These included: the teacher, program philosophy, administrative support, and the perceived importance of the program to the school. Within each of these characteristics, the major themes that were identified by the research team are described.

The commitment and dedication of the teacher to work with students was identified as the most important characteristic of successful programs, when compared with programs experiencing difficulties. When asked to provide an honest assessment of the greatest strengths of their program, teachers in those programs experiencing difficulties believed that the content of the curriculum was most important. Teachers in the "successful" group believed that they were the single greatest contributor to program success.

Teachers who knew they were experiencing difficulties believed problems were the result of inadequate technical content and, as a result, devoted increasing amounts of effort at updating the content of their courses. However, students of all programs indicated that they had originally chosen agriculture courses more for the way they were taught than for the content.

"... its not just always books, books, books..."

"(I like it) because of the hands-on."

Teachers in successful programs realized that their own personal characteristics and professional practices were at least as important as course content. Each of these teachers felt that how they taught and how they interacted with students was most important to the success of the program. Rather than devoting increasing energies to course content, these teachers reported spending much more time outside the regular school day working with students than did teachers from the "difficulty" group, an assertion supported by both student and administrator interviews.

Students felt that the teacher characteristic was manifested by a caring attitude. Students in the "successful" programs felt that their teachers cared about them as individuals and were willing to spend more time with them. When asked about student-teacher relationships, successful teachers gave an almost identical response, "Students feel at home here." Typical responses by "successful" teachers were:

"I love to teach. I just love students to death."

"If we (teachers) are willing to go the extra mile for the student, then the student is willing to do the same for us."

Teachers in the "successful" group had stronger personal philosophies about education and the mission of their programs than did the teachers in the "difficulty" group. When asked about program philosophy, "successful" teachers were quick to respond with a rationale of how their program was important to the educational mission of the school and its relationship to general education. However, teachers in the "difficulty" group could not readily respond with any general program rationale. Given a few minutes to think of a response, "difficulty" group teachers responded with rationales related to the importance of agriculture as an industry. These teachers were concerned with placing their students in farming and agriculture-related occupations. Teachers in "successful" programs were less preoccupied with student placement and were more concerned with the overall education of their students.

Teachers in both groups believed that administrative support was important to program success. Teachers in the "successful" group felt that they could not have achieved as high a degree of success without the principal having an understanding of the program's goals and philosophy. Principals of "successful" programs believed that agricultural education was important to the broader mission of the school and a general education of the students, while principals of "difficulty" programs justified the programs in terms of industry needs.

It is interesting to note that in "successful" programs principals and teachers both had broader philosophies of the mission of agricultural education and its contribution to general education than did principals and teachers in "difficulty" programs. Teachers in "successful" programs believed that administrative support was very strong, while teachers in "difficulty" programs believed that administrative support was only adequate. Among the "difficulty" schools, there may be a relationship between principal perception of the mission of the program and his/her perception of the agricultural industry. This may not exist as a direct relationship among perceptions held by principals of "successful" programs. Principals responded with remarks such as the following:

Agricultural education is ... "very important" ... to the school.

"Students feel it's important."

"He (the teacher) spends time on kid's attitudes. That's important."

"Successful" programs had positive reputations in their schools;

"difficulty" programs did not. In "successful" programs, teachers, principals and students believed that the agriculture programs provided valuable services to a wide range of students. Even students and teachers not directly associated with the programs felt the programs "were important." These programs attracted students of all academic ability levels. Principals and teachers alike felt that, "Agriculture (education) is not inconsistent with college." One principal reported that other teachers, "... realize they're doing something pretty good down there."

"Difficulty" programs were perceived by principals and students as being "for farmers." They were not held in high regard and were often even physically separated from the rest of the school, being "down in the boondocks."

Facilities of programs experiencing difficulties were less visually appealing than those of successful programs. Successful programs were in facilities equal in appearance and quality to other programs in their schools. Three of the four "difficulty" programs were located in portions of their buildings which were not well maintained, clean or attractive.

CONCLUSIONS

The "teacher" characteristic may be the most important factor in program success. Among the teachers in this study, all possessed adequate subject matter competence. However, it appears that the difference between programs is reflected in differences in teacher attitudes and beliefs about their programs and their students. To quote one administrator, "The teacher is the program."

A readily articulated, broadly conceived program philosophy is a trait of both teachers and administrators in successful programs. Successful programs, when compared with programs experiencing difficulties, were held in higher regard by principals, students in and out of the program, and other teachers in the school. A difference in climate, based upon facilities, was noted. "Successful" programs were in well maintained rooms and labs which students may interpret as an indicator of the program being well organized and inviting.

Recent research in agricultural education has been dominated by positivistic designs which reduce problems to quantifiable terms. This approach often ignores qualitative aspects of the program. While this study uncovers no new findings, it does refocus attention on a holistic view of agricultural education. If these conclusions are valid, teacher education may need to refocus from a near total emphasis on curriculum and methodology to include more attention to the affective domain of teacher preparation.

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AN ETHNOGRAPHIC APPROACH TO ASSESSING EXCELLENCE
IN AGRICULTURAL EDUCATION

A Critique

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The researchers are to be commended on taking a new approach to the age-old problem of assessing excellence in agricultural education. The holistic, ethnographic approach is a refreshing departure from our more standard quantitative research designs. Giving strength to the ethnographic approach were the multiple sources of information gathered by the four researcher-observers through interviews with teachers and principals; focus group interviews with students; and unobtrusive observations of the social and physical climates. In addition, an expert panel was used to identify the successful schools without having criteria identified for them, adding to the validity and reliability of the study. Even though it was stated that the study uncovered no new findings, it did confirm the findings of previous studies through an entirely different approach. The findings were supported by two or more sources of information, such as teacher comments supported by student and administrator interviews, and student feelings supported by teacher statements. Teachers' and principals' philosophies concurred in both successful and difficulty schools. Mission statements agreed among teachers, principals and students. Even the social and physical climates related to the identification of success or difficulty. An additional strength of this study was the theoretical construct established in the introduction. It was logically developed and well documented. The documentation was supported by an up-to-date, sound list of references.

While the holistic, ethnographic approach added to the quality of the study, it also raised interesting questions, not totally answered in the paper presented here. The question of objectivity is the first raised. It was stated that the researchers had to be objective and also account for intersubjectivity between themselves and the subjects. Although stated, the way in which this was accomplished was not spelled out. The next question concerns the holistic approach. Was not the value of the holistic, ethnographic approach the ability to study the phenomenon in the complete, natural setting? Then should not the findings have been presented as eight ethnographies? The enormous amount of mostly subjective data generated by the multiple sources of information created a huge analysis problem. How was this analysis carried out to insure representative results? Also, was there a standardized approach used for achieving consensus among the researchers? I have to ask why they could not resist generalizing from their findings, when they originally said they could not? I would also ask if they, after completing the study, went back to the panel to ask what criteria were used to choose the successful schools, to see if the criteria matched the characteristics identified through the study? I highly commend these researchers for an excellent study, which adds a new look to the body of knowledge about excellence in agricultural education.

EXEMPLARY SECONDARY AGRICULTURAL EDUCATION PROGRAMS:
WHAT STUDENTS TELL US

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INTRODUCTION

Faced with declining enrollment in secondary agricultural education programs, agricultural educators have become extremely interested in identifying strategies that will enable them to improve the quality of their programs in order to attract more students. Many of the strategies proposed to improve programs and boost enrollment are based on the perceptions of agricultural educators. For example, decisions regarding curricular change are usually made by educators based on their assessments of current student needs. Such assessments assume that educators truly are cognizant of student concerns, values, attitudes and desires.

Businesses have learned that they need to do a great deal of market research before they place products on the market. They realize that the risks are too great in simply assuming that they know market needs. Consequently, they spend a great deal of time and money getting direct feedback from customers regarding their beliefs, attitudes, and needs. It is reasonable to assume, then, that efforts to develop and market new or revised agricultural education products (e.g., courses, activities, etc.) should also utilize a consumer market research approach. Thus, any efforts to improve program quality and enrollments in agricultural education programs should involve direct input from students. Input from students enrolled in schools having exemplary agricultural education programs should provide a foundation for these efforts.

Student input regarding specific agricultural education programs is perhaps most often formally collected through the use of student evaluation instruments similar to the example provided by Phipps (1980). While student evaluations are useful, they are limited in scope. Most often, these evaluations focus on single courses and on specific factors or variables selected by the instructor or school. Little opportunity is provided for most students to express opinions regarding their true feelings concerning agricultural education programs.

A number of positivistic studies have attempted to gather student input regarding agricultural education through the use of written questionnaires. Cepica and Quarles (1984) developed such a questionnaire to determine female student perceptions of vocational agriculture in Texas. Similarly, Pals (1988) and Williams (1979) designed survey instruments to determine the value of supervised occupational experience programs as perceived by vocational agriculture students. However, very little qualitative research has been undertaken to gain student input.

While positivistic research methods have been useful in obtaining data

which focuses on specific variables, a major disadvantage of this type of research is that it may overlook other foundational variables of importance to the area of study. Consequently, it was determined that a research technique called the focus group interview would be used for this study. Krueger (1988) notes that the focus group interview has been a mainstay of private market research for many years but has only recently been implemented as a research tool by public sector organizations.

Focus group interviews are meetings of small groups of 8-12 people, randomly selected, with certain interests in common. The interview itself lasts about one hour. During the interview, participants discuss topics presented by a moderator (ideally, someone unknown to the participants). The goal of a focus group interview is to obtain information that is truly reflective of the participants' feelings and perceptions. Due to the group dynamics involved in focus group interviews, information becomes available that might not emerge in conventional methods of collecting data.

PURPOSE & OBJECTIVES

The purpose of this study was to determine the perceptions of students regarding selected aspects of agricultural education in secondary schools which have exemplary agricultural education programs. Responses were solicited from two categories of secondary students: students currently enrolled in agricultural education courses and students who had never enrolled in an agricultural education course.

Specific objectives guiding this study were: (a) to determine student perceptions regarding agriculture, (b) to determine reasons why students first enrolled in agricultural education courses, (c) to determine aspects of agricultural education programs or courses that students liked, (d) to determine aspects of agricultural education programs or courses that students disliked, (e) to determine student perceptions regarding agricultural education instructors, and (f) to determine why students did not enroll in agricultural education courses or programs.

PROCEDURES

For this study, four schools with exemplary agricultural education programs were selected. The schools were identified by a panel of teacher educators, state supervisory staff and leaders in agricultural education.

Prior to the actual focus group interviews, the researchers developed a questioning protocol. The protocol was structured according to "introductory" questions, "transitional" questions, and "key" questions. It was estimated that the introductory and transitional questions would require about five to ten minutes and that the remainder of the time would be devoted to key questions. Questions were based on previous research efforts and were revised accordingly with input received from the University of Minnesota teacher education staff and the Extension Service evaluation specialist. Special attention was given to phrasing all questions in an "open-ended" format.

Eight focus group interviews were conducted. Four were held with students currently enrolled in agriculture courses while the other four were conducted with students who had never enrolled in agriculture courses. A total

of 35 students participated in the four agricultural education student focus groups. In the focus groups with non-agricultural education students, 31 students participated. Student participants were randomly selected from each of the four schools. The interviews were conducted by a project researcher who is an experienced focus group moderator. Another project researcher served as an assistant moderator to observe the interviews and to take notes. All of the focus group sessions were recorded on audio tape to assist in the data analysis process.

ANALYSIS OF DATA

Data collected in the focus group interview process were analyzed according to procedures recommended by Krueger (1988, pp. 112-117). In this process, data are reviewed to determine consistent general themes that emerge.

The analysis process began with debriefings immediately after the completion of the focus group sessions at each school. These allowed the moderator and assistant moderator the opportunity to compare their observations and interpretations of the responses given by the focus group participants. Notes were taken during the debriefing sessions to aid in later stages of the data analysis procedures. Upon completion of the eight focus group sessions, all of the tapes were transcribed. The transcriptions were then reviewed by the moderator and assistant moderator. The purpose of the transcription review was to identify the themes and patterns that were consistent among the different groups of students. During this phase of the analysis, careful consideration was given to five factors (Krueger, 1988). These factors were (a) the actual words used and their meanings, (b) the contexts in which responses were given, (c) the internal consistency of participants' responses, (d) the specificity of responses, and (e) finding the big ideas. Joint interpretation and intersubjective agreement were used as a means to validate the data. Finally, the data was compiled in a format which identified the major findings according to the objectives of the study.

RESULTS

Perceptions About Agriculture

Agriculture students had a much more positive and broader perception of agriculture than non-agriculture students. Agriculture students viewed agriculture as touching many aspects of their lives including: food, environment, science, politics, money management and business.

"Farming" was used to describe agriculture by the non-agriculture students. Their perceptions about agriculture as a career were very negative. Many described life in an agricultural career as hard work, dirty working conditions, depressing and low pay. Non-agriculture students viewed agriculture classes as being for students who lived on farms or were interested in farming.

Agriculture students tended to feel that the attitudes of other teachers toward agriculture classes were poor. Students at one school contended that the English teacher had taken credit for the success of one student's public speaking ability when she actually learned it through FFA. Students felt that

other teachers were not aware of how much time and effort they had put into studying for FFA contests.

"The English teacher kept praising her public speaking ability in class. He doesn't realize that she got most of her practice in agriculture classes."

"FFA contests demand a lot of you. It takes a lot of time and practice to be good. We practiced for the Farm Management contest every morning for months."

Why Students Enroll in Agriculture

Associations with role models or people whom students admired were very powerful forces in influencing them to enroll in agriculture. Many students first enrolled in agriculture because of the encouragement of older family members or other students whom they respected. A few students were recruited by the agriculture teacher or by FFA officers. Most of the students were told that agriculture classes were fun.

Students (both agriculture and non-agriculture) indicated that high school counselors had very little influence on which classes they had taken. Most of the students, including the college bound, had not even visited with counselors until their Junior year. Most of the advice on which courses to take, including college preparation courses, came from older students.

What Students Like Most About Agriculture

Students liked the atmosphere and climate of the agriculture programs because teachers were more relaxed, more friendly and students were granted more independence than in their other classes. A number of students noted that they were allowed to participate in the curriculum planning process as agriculture teachers asked them what they wanted to study.

"Agriculture is not like other classes. He lets us choose what we would like to learn about."

Students appreciated the opportunity to meet people through state and national FFA activities and events. They indicated that there were closer friendships and more cooperation among classmates who participated in FFA activities.

Students liked agriculture classes because they are less structured and teachers are more flexible. Students liked the opportunity to learn about many different topics and learning from a variety of instructional techniques. Agriculture allowed students to experience more than book learning. It provided them the opportunity to apply principles learned in the classroom, to learn by doing and through trial and error. Students especially liked field trips and classroom and lab projects.

Students felt their agriculture classes were important because they motivated them to begin thinking about career possibilities. Several students mentioned the value of setting goals through agriculture and FFA.

What Students Liked About Their Agriculture Teachers

Students felt their agriculture teachers were among the best teachers in the school because they were always doing different things with them.

"He is one of the better teachers in the school. He understands kids. He helps you figure things out."

Students felt that their agriculture teachers were more caring and understanding than other teachers. They were more relaxed and easy-going. Agriculture teachers took a more personal interest in relating to their students.

"The ag teacher is the only teacher I can talk to and tell him how I really feel about things."

Agriculture teachers were different than other teachers. They spent more time with them, both inside and outside of school. Students appreciated the home visits and personal attention of their agriculture teachers.

"Agriculture teachers are there for you. They will come to your house. How many times have you seen the math teacher come to your place to help you with math problems?"

Students in two of the four schools with exemplary programs appreciated their agriculture teachers for being very demanding and ensuring that every student in the class was learning. These students appreciated the fact that their agriculture teacher(s) had high expectations of them and pushed them to succeed. In spite of their demands, many students indicated that their agriculture teacher(s) helped to make learning fun.

"He expects more of you than other teachers. You know your going to learn something in his classes."

Some students expressed neutral to negative feelings about agriculture and FFA prior to taking agriculture. Students suggested that only those who have experienced taking classes in agriculture were able to appreciate them.

"I took agriculture because I was kicked out of Spanish and needed a class. Now I enjoy it and I'm glad I took it."

Agriculture teachers placed a great deal of importance on FFA. Much of the preparation for FFA activities and contests was done during class. Agriculture teachers often pressured students into joining the FFA.

"He gets his way. He stays on you until you join FFA (but) when kids get to the 11th grade they are glad they joined because they really enjoy it."

While students stressed that their agriculture teachers were competent in the subject matter, they also felt that their teachers taught relevant life skills. Agriculture teachers in exemplary programs appear to stress the general educational aspects of learning. They helped students see the relevance of learning and how it could benefit them later in life.

"The things we learn in this class we will probably use in the future like leadership, speaking and interviewing."

Students appreciated those agriculture teachers who exerted a personal effort in helping them to identify prospective colleges, gather information, complete financial aid materials and apply for scholarships. Many students were also grateful of the scholarships they had received through the local and state FFA programs.

"He helped me find scholarships to go to college."

What Students Disliked About Agriculture Classes and Teachers

Some students enrolled in agriculture because they felt it was an easy class. Others were irritated by the attitudes of these students because they were disruptive in class, didn't care and interfered with learning. Some students felt that counselors and principals viewed agriculture classes as a dumping ground for un-motivated students.

"The counselor sends us the rejects and the druggers."

Dislikes of Students about Agriculture Teachers

Those students not involved with FFA felt that agriculture teachers placed too much emphasis on the FFA organization. Students complained that classmates who were in FFA received preferential treatment. Because of this, those students not interested in participating in contests felt less important, sometimes ignored by the teacher.

"He overstresses FFA. We do contest work in class. It doesn't bother me; but if you're not in a contest you feel like you're sitting out in the hall."

"When the class is preparing for contests, he ignores people who are not in FFA."

Most agriculture students indicated that they would take agriculture classes if FFA were not a part of the program. However, they believed that FFA is what motivated their agriculture teacher(s). Upon further reflection, students generally felt that their agriculture classes might not be the same without FFA. Some even thought agriculture classes would be boring without FFA.

Why Don't Students Enroll in Agriculture

Generally, students who had never enrolled in agricultural education courses felt that it would be very difficult to get them to enroll. The most common reasons for their beliefs were negative perceptions of agriculture as a career and the concern that such courses would not help them get into college. Although they felt that agriculture as an industry was important, they just didn't feel that it was of interest to them.

To a limited degree, they thought that agricultural education courses that met high school science credit requirements might cause them to consider taking

agriculture classes.

CONCLUSIONS AND IMPLICATIONS

Due to the research design used in this study, it is not possible to generalize results to a larger population. However, a number of implications and conclusions were reached.

Students in exemplary programs commented very favorably on the caring and commitment demonstrated to them by their agriculture instructors. They especially noted the willingness of their instructors to spend time extra time with them. Exemplary program teachers also had high expectations of their students. It appeared that the teacher was a major factor in their decisions to remain enrolled in agricultural education courses. The instructor plays a major role in the success of these exemplary programs and how he/she teaches may as important as curriculum.

It appears that efforts to recruit students with negative perceptions of agriculture or with strong college-preparation course goals are basically unsuccessful. These factors essentially translate into lack of interest in agricultural education. Non-agricultural education students felt that there was very little that could be done to entice them to enroll.

It should be noted, however, that agricultural education students thought that recruitment efforts they experienced prior to becoming high school student were quite effective. Several noted that these efforts were instrumental in their decisions to enroll in agricultural education.

Student perceptions about the FFA programs in exemplary programs warrants further research. The FFA programs in all of the schools studied were very successful. However, some agriculture students not participating in FFA activities expressed negative views about the organization and the way the instructor taught or promoted it. This contrasted with the generally favorable comments expressed by active FFA members. Further research with both groups of students could be valuable in determining better ways to utilize the FFA organization.

It appears that the counselor is not a major factor in student decisions to enroll in agricultural education. Counselors basically played a very small role in course selection for the students participating in this project. A much more important factor is input from other students. Agriculture teachers interested in stepping up their recruiting efforts should concentrate on 7th and 8th grade visits and on asking their currently enrolled students who are influential to promote the program to other students.

Students enrolled in these exemplary agricultural education programs noted that a major reason they liked program courses was that they were different from the other courses they took in their high schools. They enjoyed the experiential nature of the agricultural education courses (e.g., field trips, shop activities, FFA activities, etc.). Given the current reform efforts underway in secondary agricultural education, there may be a real danger in attempting to become more like the academic courses in the high school. If agricultural education programs become more like other programs, and lose their uniqueness in the process, there is a possibility en¹¹²rollments may further decrease, rather

than increase as intended.

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EXEMPLARY SECONDARY AGRICULTURAL EDUCATION PROGRAMS:
WHAT STUDENTS TELL US.

A Critique

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There is value in using market research techniques to identify consumer choice. Too, ". . . very little qualitative research has been undertaken to gain student input." The purpose and objectives were clear and explicit. The literature review was limited to agricultural education and did not attempt to build on a theoretical framework of perception and image.

My major concern hinges on the procedure to select exemplary programs. Did the panel who identified the four "exemplary" programs have a set of criteria, or was the selection based on image and perceptions formed from active FFA Chapters with success in contests and awards? I want to know more about the environments of the programs; the demographics, ethnicity, social and cultural influences, and many others characteristics which explain the perceived excellence.

The design followed the recommendations of Krueger (1988) and used appropriate data collection and analysis techniques. There was excellent instrumentation using questioning protocol, audio tape documentation, and transcription. However, there may have been need for expanded field notes. Evertson and Green (1986) recommended four types: personal, methodological, theoretical, and descriptive. They concluded that "the four sets of notes help to provide systematic information about the inquiry process and help frame the analyses of the data" (p.179).

After the first page of results, I began to question objectivity. The results sounded as if they were written by four former agriculture teachers who were recalling the "good ole days." At this point, I also became more curious about the nature of the schools. Evertson and Green (1986) described comprehensive, topic-centered, and hypothesis testing ethnography. Can we learn what student believe using this limited, biased sample? Perhaps.

I commend the authors for innovation. They have begun to explore the nature of excellence from a new perspective. However, we must be cautious that we do not seek conclusions which fit existing paradigms. The authors concluded that students appreciate teachers who care and programs that involve students in curriculum design and learning. They concluded that perceptions were formed about agriculture during early years and counselors were not major players. If we are to learn from this research technique, we must be sure we fully understand the complex relationships.

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FOLLOW-UP OF 1983 FLORIDA AGRIBUSINESS AND
NATURAL RESOURCES EDUCATION PROGRAM COMPLETERS

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INTRODUCTION

Accountability has been an important concern in vocational education for many years. The Carl D. Perkins Act (P.L. 98-524) specifically emphasizes accountability and the need for evaluative data. Additionally, some states have passed specific legislation requiring programs to be accountable for expenditures. For example, Florida enacted legislation that sets minimum placement standards for all vocational programs (Florida Statute 229.551).

Program improvement efforts will be more successful if they are planned based upon accurate evaluative data. The recent national study of agricultural education in the secondary schools (National Research Council, 1988) indicates that one of the major leadership challenges related to program reform is program evaluation.

An important source of evaluative data for vocational education programs is the graduates of those programs. In addition to knowing placement and completion rates, it is important to have an understanding of student attitudes about the educational experiences they received while enrolled in vocational education.

Most follow-up studies in vocational agriculture have been concerned with the employment status of graduates. One major follow-up study of vocational agriculture graduates was a 1978 southern regional study (Iverson and Brown, 1979). Among the findings were that over half of the 1974 graduates entered the job market after high school, less than one-fourth took one or two years of college, and only 13 percent completed a four year college program. Nearly one-half of the respondents were employed in non-agricultural occupations while 31.8 percent were in full or part-time farming or ranching and 34.7 percent were involved in other agricultural pursuits. Graduates demonstrated a high degree of support for their programs by indicating agreement with most of the positive statements designed to measure respondent attitudes toward the program.

Data from the southern region study were further analyzed to determine if categories of responses could be identified and if relationships existed between the categories and the demographic variables (Iverson, Jewell, Davis, and Brown, 1982). Variations among states accounted for variation in respondents' evaluations more than any other variable. Race, educational level, years of vocational agriculture, participation in Future Farmers of America activities, and supervised occupational experience program participation also strongly affected responses.

Little (1982), in a review of state-wide follow-up studies of former vocational agriculture students, reported a decreasing percentage of graduates who enter farming as an occupation, while the number of graduates

entering non-farming agricultural occupations or non-agricultural occupations was increasing.

This study is the third phase of a longitudinal study designed to follow up 1983 Agribusiness and Natural Resources Education program completers in Florida. In the first phase of the study (Arrington and Price, 1983), the attitudes of high school seniors about experiences received while enrolled in vocational agriculture were determined. In addition, the study identified demographic variables that were related to attitudes about experiences in vocational agriculture. Phase one also collected information on the occupational plans of the students.

In the second phase of the study (Arrington, 1984), the attitudes of the 1983 high school graduates (one year after graduation) concerning experiences received while enrolled in vocational agriculture were determined. Additionally, students were asked to indicate their current occupational status.

The primary purpose of the current study (Phase III) was to determine student attitudes about their experiences in vocational agriculture five years after completing the program and determine if their attitudes are related to their current occupational status.

OBJECTIVES OF THE STUDY

Specifically, the study was designed to:

1. Determine the current status of 1983 program completers of Florida vocational agriculture/agribusiness programs with regard to occupation, further education, economic level, and other pertinent demographic factors.
2. Compare the current occupational status of 1983 program completers with their pre-graduation occupational plans and their occupational status one year after graduation.
3. Determine program completer attitudes about experiences in vocational agriculture and compare their current attitudes with their pre-graduation attitudes and attitudes one year after graduation.
4. Determine if program completer attitudes about the value of vocational agriculture are related to their current occupational status (ag vs. non-ag), education level, years in FFA, and highest FFA degree achieved.

RESEARCH PROCEDURE

The population consisted of all high schools in Florida with an Agribusiness and Natural Resources Program during the 1982-83 school year. In 1982 all of the 333 senior high teachers identified were asked to have each senior student complete a demographic questionnaire. Two follow-up contacts resulted in 310 (93%) responses. As a result, 1848 seniors were identified to form the accessible population. To accomplish the objectives of Phase III, a random sample of 300 students (95% confidence level) was selected.

A mail questionnaire was developed and was pilot tested with a group of program completers who were not included in the sample. The information from the pilot test was used to check the clarity of instructions, appropriateness of questions, and other factors that might affect the response rate. The reliability coefficient of the questionnaire was .90.

Data for the study were collected in March, 1988. Three follow-up contacts yielded 135 (45%) returns. There were 30 students who had moved and could not be reached. A telephone follow-up was conducted to determine if respondents and nonrespondents were different. Results indicated that nonrespondents were more likely to be employed in agriculturally related occupations than respondents. The findings of this study should be interpreted with this limitation.

Descriptive statistics were utilized to accomplish the first three objectives. For the fourth objective, each of the program evaluation statements was first examined by factor analysis. Chi-square statistics and Pearson correlation coefficients were utilized to examine the relationship between categories of evaluative statements and occupational status, education level, years in FFA, and highest FFA degree achieved.

RESULTS

OBJECTIVE ONE

Data collected for objective one revealed that 97% of the respondents were white. The program area with the largest enrollment was production agriculture (30.1%) followed by ornamental horticulture (23.6%) and agriculture mechanics (17.2%).

Less than four percent of the respondents had not been an FFA member. Approximately 7% had been a member of FFA for three years or more. There were 29 (22.1%) students who had earned the State FFA degree. Twenty-two (16.8%) students had not earned at least the Greenhand degree.

Approximately 3% were employed in a non-agricultural occupation. Slightly more than eight percent were full-time farmers or ranchers and about 11% indicated they were a part-time farmer or rancher. Thirty-seven (28.1%) were in an agricultural occupation other than farming. Approximately 13.7% of graduates were attending a college or postsecondary vocational school. Nine (6.8%) respondents indicated they were unemployed. However, it should be noted that some of the unemployed were attending college.

Occupational status was analyzed eliminating duplicate responses. Any respondent employed full-time or part-time in an agricultural occupation regardless of other responses (such as attending college) was classified as being employed in an agricultural occupation. There were 63 (46.7%) respondents employed in an agricultural occupation.

Relative to the economic status of respondents, 20.3% of those who reported an income were making less than \$10,000 annually. Slightly over 26% had an annual income between \$10,000 and \$14,999 and, 30.5% reported an

annual income between \$15,000 and \$19,900. Slightly under four percent indicated their annual income was over \$35,000.

OBJECTIVE TWO

Phase I of this study revealed that only 13.9% of the seniors planned to be involved full-time or part-time in farming (see Table 1). However, 22% of the completers one year after graduation indicated they were engaged in farming on a full-time or part-time basis and 18.9% were farming five years after graduation. There were 105 (42.6%) completers employed in an agricultural occupation other than farming one year after graduation. Five years after graduation 28.1% were employed in agricultural occupation outside of farming. Over one-half (55.3%) indicated that their present job was at least somewhat related to their vocational agriculture training. The percentage of respondents in the military doubled from 1984 (5.4%) to 1988 (12.1%).

OBJECTIVE THREE

To measure program completer attitudes, each person reacted to sixteen statements related to their vocational agriculture experiences. A four-point Likert scale was utilized to categorize responses to the evaluative statements. Students could strongly agree, agree, disagree, or strongly disagree with each of the items.

Table 1

Comparison of Plans After Graduation with Actual Occupational Status

Occupational Categories	Pre-graduation Plans (N=310)		One Year After Graduation (N=204)		Five-Year Actual Total (N=132)	
	No.	%	No.	%	No.	%
Farm	8	2.6	17	8.3	11.0	8.3
Farm (part time)	35	11.3	28	13.7	14.0	10.6
Agricultural Occupation	30	9.7	105	42.6	37.0	28.1
Non-Agricultural Occupation	24	7.7	74	36.3	39.0	29.5
Post-Secondary Vocational School	24	7.7	16	7.8	1	8
College	117	37.7	43	21.1	7	12.9
Military	42	13.5	11	5.4	16	12.1
Don't Know	54	17.5	*	*	*	*
Unemployed	*	*	18	8.8	9	6.8

(1) Percentages add up to more than 100 percent due to multiple responses.

(*) Not asked

In general, experiences in vocational agriculture received very high ratings from the respondents (see Table 2). For the statement, "vocational agriculture taught me skills useful in production agriculture", 94.8% of the students either agreed or strongly agreed. In comparison, 99.4% had agreed or strongly agreed before graduation and 98% one year after graduation. When asked "would you enroll in vocational agriculture if you had it to do over again", 94.0% of the students responded positively five years after graduation with 96.8% responding positively before graduation. Only 53.3% of the students were in agreement that vocational agriculture helped them choose an occupation. Prior to graduation, 73.4% of the students had agreed with this statement.

Data in Table 3 reveal that relative to teacher assistance received while in vocational agriculture, 88% of the graduates indicated their teacher had provided information on careers within agriculture. Ninety-seven percent had responded to this question positively before graduation. Approximately 76% of the seniors indicated that their teacher encouraged them to enter an agricultural occupation. Before graduation 88% responded positively to this question.

OBJECTIVE FOUR

Objective four was to determine if student attitudes about the value of vocational agriculture were related to their occupational status, economic level, further education, and demographic factors. Each of the sixteen program evaluation statements was examined by factor analysis. Variables loading .60 or higher on a factor were considered in interpreting the meaning of the factor.

Four items loaded into factor 1 (Values of the Program): "Vo Ag helped me develop leadership skills (.67)", "Vo Ag helped me learn to get along with others (.66)", "Vo Ag classes were good for me (.70)", and "If I had it to do over again, I would enroll in Vo Ag (.62)". Three items loaded into factor 2 (Instructional Program): "Vo Ag taught me skills useful in agribusiness and natural resources (.72)", "Vo Ag helped me learn to work in production agriculture (.60)", and "Vo Ag helped me learn to work in agribusiness and natural resources (.68)". Three items loaded into factor 3 (Career Guidance): "My teacher encouraged me to enter an occupation in agriculture (.78)", "My teacher encouraged me to consider attending college (.76)", and "My teacher provided me with information on careers within agriculture (.69)".

To determine if occupational status (ag vs. non-ag) was associated with attitudes, Chi-square statistics were computed. Occupational status was not associated with factor 1 ($\chi^2=3.87$, $p>.05$), factor 2 ($\chi^2=2.557$, $p>.05$), or factor 3 ($\chi^2=5.43$, $p>.05$). Highest educational level achieved was also not associated with factor 1 ($\chi^2=10.94$, $p>.05$), factor 2 ($\chi^2=4.77$, $p>.05$), or factor 3 ($\chi^2=9.94$, $p>.05$).

Pearson correlation coefficients were computed to determine if years in FFA and highest degree earned were related to the three factors. There was a significant ($p<.05$) positive relationship between years in FFA and factor 1 ($r=.17$) and factor 3 ($r=.27$). There was also a significant ($p<.05$) positive relationship between highest FFA degree earned and factor 1 ($r=.29$) and factor 3 ($r=.20$).

Table 2

Ratings of Statements About the Vocational Agriculture Program
by Students Before and After Graduation

Statement About Vocational Agriculture Experience	Percentages of Responses				Mean Response
	Strongly Agree	Agree	Disagree	Strongly Disagree	
Taught me skills use- ful in production agriculture	34.0	65.4	0.3	0.3	3.33 (C)
	50.7	47.3	1.5	0.5	3.48 (B)
	35.8	59.0	3.7	1.5	3.29 (A)
Taught me skills use- full in agribusiness and natural resources	24.8	68.6	6.4	0.3	3.18 (C)
	38.5	51.2	8.3	2.0	3.26 (B)
	27.8	63.9	7.5	0.8	3.19 (A)
Helped me learn how to participate in meetings	38.5	54.8	5.8	1.0	3.30 (C)
	54.6	36.7	6.8	1.2	3.44 (B)
	36.8	53.4	9.0	0.8	3.26 (A)
Helped me choose an occupation	21.0	52.4	25.9	0.6	2.94 (C)
	22.6	36.9	34.9	5.4	2.77 (B)
	15.0	38.3	40.6	6.0	2.62 (A)
Helped me develop leadership skills	38.1	54.5	7.1	0.3	3.31 (C)
	48.0	44.5	6.0	1.5	3.39 (B)
	28.5	55.4	15.4	0.8	3.12 (A)
Helped me understand how to enter and ad- vance in agricultural occupations	29.7	63.9	5.8	0.6	3.22 (C)
	31.0	52.7	13.3	2.9	3.12 (B)
	15.0	61.7	21.0	2.3	2.89 (A)
Helped me to see the need to get along with others on the job	43.4	53.4	3.2	—	3.40 (C)
	47.8	43.9	5.5	2.9	3.37 (B)
	30.1	57.9	12.0	—	3.17 (A)
Helped me learn to work in production agriculture areas like farming, greenhouse plant production, or nursery operation	47.1	51.0	1.9	—	3.45 (C)
	53.7	42.0	3.9	0.5	3.49 (B)
	33.8	57.9	6.8	1.5	3.24 (A)
Helped me learn to work in agribusiness and natural resources areas like sales and services, forestry, or food processing	17.9	62.8	17.9	1.2	2.97 (C)
	30.9	46.6	20.6	2.0	3.06 (B)
	17.6	55.0	24.4	3.1	2.87 (A)
Helped me learn to get along with other people	36.3	61.1	2.3	—	3.34 (C)
	44.1	50.0	4.4	1.5	3.37 (B)
	29.3	61.7	8.3	0.8	3.19 (A)
Vocational agriculture classes were good for me	46.5	51.9	1.3	0.3	3.44 (C)
	68.5	30.6	.5	0.5	3.67 (B)
	53.0	43.2	3.8	—	3.49 (A)
If I had to do it over I would re-enroll in vocational agriculture	53.5	43.3	2.9	0.3	3.50 (C)
	77.3	19.3	2.9	0.5	3.73 (B)
	63.9	30.1	3.8	2.3	3.57 (A)

*Coded as SA=4, A=3, D=2, and S=1.

(C)=Before graduation, 1983; (B)=After graduation, 1984; (A)=After graduation, 1988

Table 3

Ratings of Statements About Teacher Assistance
by Students Before and After Graduation

Statements About Teacher Assistance	Strongly Agree	Percentages of Responses			Mean Responses
		Agree	Disagree	Strongly Disagree	
Encouraged me to enter an occupation in agriculture	28.8 49.0 29.1	59.6 40.3 47.0	10.6 7.3 23.1	1.0 3.4 .8	3.16 (C) 3.35 (B) 3.04 (A)
Encouraged me to consider attending college	27.6 30.2 33.1	49.7 31.7 42.1	22.1 13.7 22.6	.6 4.4 2.3	3.04 (C) 3.28 (B) 3.06 (A)
Provided me with information on careers outside of agriculture	15.7 28.9 18.0	58.0 40.5 44.4	25.6 22.9 30.8	.6 7.8 6.8	2.88 (C) 2.90 (B) 2.74 (A)
Provided me with information on careers within agriculture	36.9 59.6 36.1	59.9 30.7 51.9	3.2 7.2 9.8	--- 2.4 2.3	3.33 (C) 3.48 (B) 3.22 (A)

*Coded as SA=4, A=3, D=2, SD=1

(C)=Before graduation, 1983; (B)=After graduation, 1984; (A)=After graduation, 1988

CONCLUSIONS

1. Almost one-half of the 1983 vocational agriculture completers were employed in an agriculturally related occupation five years after program completion. When those who continued their education and those who entered military are combined, it accounted for approximately two-thirds of the respondents.
2. Respondents were generally not employed in occupations in which they planned to be employed when asked in 1983.
3. Attitudes of respondents about the vocational agriculture program five years after graduation were similar to those identified prior to graduation, although in most cases, the mean response five years after graduation tended to be slightly less positive than before graduation.
4. Years in FFA and highest degree earned in FFA were related to factors 1 (Value of program) and factor 2 (Instructional program). However the strength of the relationships was low in all cases. Whether or not the respondents were employed in an agricultural occupational was not related to any of the factors.

RECOMMENDATIONS

1. Additional graduating classes should be examined to determine their attitudes and occupational status.
2. Future studies should attempt to classify employment status according to the degree to which graduates are using skills learned in vocational agriculture.
3. Department of Education personnel and legislators should be informed of the positive attitudes and employment success of program completers.

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FOLLOW-UP OF 1983 FLORIDA AGRIBUSINESS AND NATURAL
RESOURCES EDUCATION PROGRAM COMPLETERS

A Critique

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This paper represented the results of the third phase of a longitudinal follow-up study of graduates of high school agriculture graduates in Florida. The study was very well designed in that it sought not only to obtain data from the students after graduation, but also to follow through with the former students at set intervals. It is apparent that a sufficient amount of planning went into the study. A thorough theoretical base and rationale for conducting the study was logically and succinctly presented. The objectives were clearly stated and instrumentation was designed that directly related to the objectives. The procedures used in instrument development and data collection were sound. A pilot test was used to establish validity of the instrument. The instrument reliability of .90 was certainly acceptable.

Over all, I feel this was a useable study that should contribute to an evaluation of the programs in Florida. I do, however, have a few questions. First, the study would be stronger with a larger response rate. With a return rate of only 45%, one has to question whether the sample is truly representative of the entire population. Second, I question the usefulness of the comparison of the job status data collected in 1983 with that collected in 1988. Since there were 310 responses in 1983 and only 132 in 1988, we really can't do a percentage comparison because we don't know what the other 178 are doing. Third, I question the validity of the finding concerning the perception of the graduates regarding the usefulness of the skills taught in production agriculture. If only 46.7% of the students were employed in agriculture, is it reasonable to assume that 94.8% of the students would be in a position to say that the skills were useful in production agriculture? I feel that the researchers were aware of the limitations of the study and, like the researchers in the previous study, were careful in drawing conclusions and making recommendations.

FOLLOW-UP STUDY OF INTERNATIONAL GRADUATE STUDENTS IN AGRICULTURAL EDUCATION AT THE OHIO STATE UNIVERSITY

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INTRODUCTION

The primary goal of international students who attend U.S. colleges and universities for graduate study is to receive the "best" education available (Kaplan, 1983). These international students do not differ from domestic students in their desire to acquire the necessary knowledge and skills that will adequately equip them for a professional role in society; however, unlike domestic students, 85% of the international students do not remain in the United States upon completion of their degrees (Altbach, Kelly, & Lulat, 1985).

The 1986/87 annual census of foreign students conducted by the Institute of International Education (Open Doors, 1987) reported over 349,000 foreign students in U.S. colleges and universities, of which 42% were at the graduate level. The 1988 enrollment at The Ohio State University, Columbus, indicated that international students at the graduate level represented 22% of the total graduate enrollment. In the College of Agriculture at The Ohio State University, international students comprised 48% of those enrolled at the graduate level in 1988. The Department of Agricultural Education had 25 international students (47%) enrolled during the 1988-89 academic year. The international students assume they will apply their U.S. education and training upon returning to their home country.

Studies that investigate the relevance of academic programs offered by U.S. institutions indicate that when returning to their country, international students may not make effective use of their U.S. education, and their graduate program of study does not always correspond to their job responsibilities (Lee, Abd-Ella, & Burks, 1981). Altbach, Kelly, & Lulat (1985) summarized the research on the curricular relevance of academic programs offered by U.S. institutions:

"...in general, U.S. curricula are not particularly suited to the needs of international students coming from Third World countries--especially with respect to technical disciplines (engineering, agriculture, etc.) at the advanced levels. . . also, international students find technical knowledge (gained from practical training experience obtained following completion of studies) more useful than theoretical knowledge." (p. 32).

The relevancy of U.S. education is a critical issue in planning graduate programs for international students.

PURPOSE AND OBJECTIVES

At the present time, reliable data do not exist that provide an accurate record of the current positions and job responsibilities of international students who graduated from The Ohio State University with advanced degrees in agricultural education. To effectively plan and deliver quality graduate education for international students, information is needed on the relation-

ships between the graduate program of studies for international students and their current job responsibilities. The primary purposes of this study were to describe the employment status of international agricultural education graduates and to determine the usefulness of their graduate education program.

The specific objectives of the study were:

1. To identify the types of positions currently held by international students with advanced degrees in agricultural education.
2. To assess the usefulness of courses in the agricultural education graduate program as perceived by the international students in relation to their current job responsibilities.
3. To provide anecdotal data regarding perceptions of graduate study.

PROCEDURES

The design for the study was descriptive survey. The target population for the study was the international students who graduated from the Department of Agricultural Education at The Ohio State University during the years 1980-1988. Thirty-five international students were identified who had received graduate degrees between the years 1980 and 1988. Fifty-five percent of the students had obtained Ph.D. degrees and 45% had received Masters degrees. Seventy-one percent of the students had an extension education focus and 29% had a teacher education focus. A follow-up study of these 35 graduates was conducted.

A questionnaire was developed specifically for use in the study. Part I collected background information and a description of current job responsibilities. Part II asked the graduates to evaluate the usefulness of specific university courses in relation to current job responsibilities using a four-point Likert-type scale with '4 = very useful' to '1 = not useful'. Part III consisted of four open-ended questions that documented student perceptions of graduate study. Content validity was established by a panel of teacher educators and international graduate students. A reliability coefficient (Cronbach's alpha) of .87 was calculated for the scale used in Part II of the questionnaire.

The questionnaire, a cover letter, and a self-addressed envelope were mailed to the 35 international graduates. Two months after the initial mailing, a second questionnaire, a cover letter, and a self-addressed envelope were sent to non-respondents. Twenty-nine of the international graduates returned usable questionnaires for an 83% rate of return. Two questionnaires were returned due to inaccurate addresses; attempts to locate accurate mailing addresses were unsuccessful. Two former students declined to return the questionnaire and two questionnaires were undeliverable due to political unrest in the particular country.

RESULTS

The findings of the study are presented regarding: (a) background information on the responding graduates; (b) a description of current job responsibilities; (c) an evaluation of the usefulness of specific university courses; and (d) perceptions of graduate study.

BACKGROUND INFORMATION

The 29 graduates represented 14 different countries. Forty-three percent (n = 13) of the responding graduates are from southeast Asia, 31% (n = 9) are from Africa, and 14% (n = 4) are from the Middle East. Six of the former students are female and 23 are male. Sixty-five percent of the graduates had received funding from their home government to attend graduate school and 14% used personal funds. The remaining 21% received funding from U.S. and international agencies (e.g., World Bank, USAID). Two former students had graduate associateships to help fund their schooling.

CURRENT EMPLOYMENT STATUS

As illustrated in Table 1, 25 of the 29 responding graduates are employed. Three are full-time doctoral students, and one former student is fulfilling mandatory military obligations. Of the 25 graduates who are employed, 21 responded that they are working in a position for which they were educated. During their graduate study, 17 of the graduates indicated that they had been on a leave of absence from a position in their home country and 13 had returned to this same position.

Sixty-eight percent (n = 17) of the employed graduates are working at a university. Nine graduates are lecturers, four are assistant/associate professors, three are department heads, and one former student is the dean of a college of agriculture. Six graduates are agricultural extension training officers for their home governments. One former student was unable to obtain a university position and is working in private industry, and one graduate is teaching agriculture at the secondary level. Over two-thirds (72%) of the graduates indicated that a portion of their job is administrative in nature. Administrative responsibilities ranged from 5% to 60% for the respondents, and included the following types of activities: supervising office staff or technicians, serving as a liaison between the university and the ministry of education, directing a regional research center, serving as secretary of an academic unit, and serving on university, college, and departmental committees.

Table 1
Current Positions of International Graduate Students N = 29

Position	n
University	
Lecturer	9
Assistant Professor	3
Associate Professor	1
Department Head	3
College Dean	1
Ministry of Agriculture/Education	
Extension Training officer	6
Private Industry	1
Secondary Ag Instructor	1
Full-time Graduate Student	3
Military Service	1

USEFULNESS OF UNIVERSITY COURSES

The graduates were asked to rate the usefulness of specific categories of courses in relation to their current job responsibilities. As illustrated in Table 2, the courses rated the most useful were those dealing with: a) teacher educator preparation, b) data collection/instrumentation, c) research methodology, design, and analysis, and d) program planning. Eighty-three percent of the graduates who had taken coursework in teacher education rated these courses as very useful in relation to their current job responsibilities. As illustrated by the mean rankings, extension program planning had the highest mean score for usefulness of course, followed by data analysis, instrumentation, and research methods. Coursework in technical agriculture and computers received the lowest mean scores.

Table 2
Usefulness of Courses in Relation to Current Job Responsibilities N = 29

Category	No. of Students Taking Class	% Response			Mean	
		Very Useful	Somewhat Useful	Not Useful		
Teacher Educator Preparation	11	83	0	0	17	3.45
Instrumentation/Data Collection	18	78	11	11	0	3.67
Data Analysis	21	76	14	10	0	3.68
Research Methods	28	72	21	7	0	3.64
Extension Program Planning	25	72	28	0	0	3.72
Research Design	11	64	23	13	0	3.50
Program Evaluation	24	58	38	4	0	3.54
Curriculum Development	11	55	27	9	9	3.27
Beginning Statistics	23	52	31	13	4	3.30
Adult Education	12	50	33	17	0	3.33
Computers	12	50	40	42	8	2.92
Administration/Supervision	22	41	36	18	5	3.14
Secondary School Program	13	39	39	15	7	3.08
Technical Agriculture	13	23	39	31	7	2.77

^aMean is based on a 4-point scale with 4 = Very useful, 3 = Useful, 2 = Somewhat Useful, and 1 = Not Useful.

PERCEPTIONS OF GRADUATE STUDY

When asked why they had chosen The Ohio State University for graduate education the respondents identified three main reasons: a) the outstanding reputation of the Department of Agricultural Education, b) the courses offered at the university matched their personal educational goals, and c) the availability of excellent computer and library facilities.

The most frequently mentioned courses that the students wished they had taken during their graduate program included, in rank order: statistics, extension administration, computer education, research design, and program planning.

The graduates recommended that international students get involved in a variety of activities during graduate study. Attending professional

conferences and visiting secondary schools and extension offices were the most frequent responses. Several of the graduates stressed the importance of internship programs at local schools and county extension offices. Participation in social/cultural events, sponsored by the department, university, or community was also recommended as an essential component of graduate education. The graduates warned international students not to isolate themselves from other students in the department.

The graduates were asked what general advice they would give to international students considering graduate study in the United States. Learning about U.S. culture, customs, and traditions was the most frequently mentioned response. The graduates advised prospective students to choose carefully their area of graduate study and not to make major program decisions hurriedly. Practicing oral and written English skills was mentioned by several former students. The graduates told potential students to be prepared to study long hours and to carry a heavy course load.

CONCLUSIONS AND/OR RECOMMENDATIONS

The majority of the international graduate students are working in a position for which they were educated. The international students perceived that most of their graduate courses were useful or very useful in relation to their current job responsibilities. Courses involving teacher educator preparation, research methodology, instrumentation, data collection, and analysis techniques, and program planning/evaluation were perceived to be the most useful. Technical agriculture and computer courses were the least useful in relation to current job responsibilities.

Providing a quality graduate program of study is a primary objective of the Department of Agricultural Education at The Ohio State University. Both domestic and international students need to be involved in meaningful learning experiences during their graduate program. Information from international graduates may help to develop relevant programs of studies for future international students.

Advisors in the department should share the findings from the study with their new international graduate students. Advisors need to discuss the expected job responsibilities of the advisee upon completion of graduate study. Future job duties may not be clearly articulated by the student's home government or university. A programmed course of graduate study will not necessarily be appropriate for all international students. With over two-thirds of the graduates in this study involved in some level of administrative work, administration/supervision courses may need to be emphasized. Internships and/or informal meetings with local extension agents and agriculture teachers appear to be important considerations when planning international graduate programs. Departments may need to develop a systematic, structured approach for ensuring that international students obtain first-hand experience. International and domestic students usually are involved in an informal network system. Advisors should be aware of their international advisee's involvement in a variety of departmental, university and community activities. International students may be reluctant to participate in certain meetings or activities; advisors should take the initiative in inviting students to specific activities.

Additional questions remain that could be investigated by teacher educators in agricultural education. Are international students being "overeducated" in some areas and "undereducated" in others? Students may be taking a disproportionate number of courses in one field at the expense of gaining knowledge and skills in other fields of study. Documenting daily job activities upon return home with actual coursework taken may reveal a different dimension of "usefulness of courses" as perceived by international students. What forms of communication linkages have been established to maintain contact with international graduates upon graduation? Former students need to receive periodic updates on professional improvements and activities. Investigating the type and number of communications would portray departmental contact with international graduate students.

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FOLLOW-UP STUDY OF INTERNATIONAL GRADUATE STUDENTS IN
AGRICULTURAL EDUCATION AT THE OHIO STATE UNIVERSITY

A Critique

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The research summarized in this paper addressed an important and often overlooked topic - that of following-up international graduate students. The topic is of particular interest to the Agricultural Education Department at Ohio State because these students represented almost one-half of their graduate enrollment last year.

The methodology used in collecting data for the study was particularly sound. Since the population of the past eight years was only 35 people, it was obvious that a population study was preferred over a sampling. Studies using the entire population present problems in securing responses from all of the population. Usually this means obtaining as close to 100 as possible, then doing a follow-up in person or by telephone of the non respondents to determine any differences. This study was especially difficult because of the problems of locating and communicating with the former students. The researchers seemed to have made every attempt to obtain data from all of the students. Although six (17%) of the students were not included in the study, there was apparently nothing the researchers could have done to have collected responses from these former students. Instrument construction was accomplished using correct procedures and the reliability was acceptable.

The weakness of the study lies more in the population than with the methodology used by the researchers. For such a small N there was a great diversity in the former students. First, only 29 students represented three distinctly different cultures. Second, the population represented graduates over an eight year period. Third, although a common thread of education ran through the occupations, the former students represented several jobs. Two suggestions might help this problem: (1) Categorize the responses by the type of job the respondents were holding. I realize that this would probably take more space than was allowed for the paper. I suspect that this was done in the complete study. Stronger recommendations could be made in regards to the students' program design if the data were broken down by occupation. (2) If the study is repeated, the respondents should be asked if the reasons they considered certain courses to be of little use were due to the subject matter or to the instructor. A good point in case is the response that computer courses were among the lowest scored courses, yet the data indicated that computer education was among the most frequently mentioned of the courses the former students wished they had taken.

In conclusion, I feel this study was well done, given the limitation of access to the population. I think the researchers were well aware of the limitations and were careful that the conclusions and implications did not go beyond the data collected.

HEALTH STATUS OF TEACHER EDUCATORS IN
AGRICULTURE: A NATIONAL STUDY

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INTRODUCTION

In 1982, the United States spent more than \$320 billion for health care, and most of that cost was borne by the employer. It is estimated that over 500 million workdays are lost because of illness or disability (Health Insurance Association of America, 1984). A study by Coopers and Lybrand (reported in Wellness at the Worksite, 1984) found that private companies are paying out as much as 25 percent of total payroll for health care, including hidden or forgotten items such as:

- * Absenteeism
- * Disability
- * Turnover
- * Decreased production
- * Replacement/recruiting.

Educational institutions are not escaping the high cost of poor health. A study by Lee and Westrom (1988) found that one small group of high school teachers in the United States (12,000 vocational agriculture teachers) missed over 43,000 days in 1987 because of health related factors. A conservative estimate of the cost to high schools in terms of lost wages, substitute pay, etc., by this group was \$6.5 million.

Despite the high cost to educational institutions, there is little scientific information currently available regarding the health of teachers and subsequent job performance. Harlin, Director of Health Services for the Seattle public school system, notes that she has been unable to gain information regarding teacher health from public schools, government agencies, universities, teacher organizations, insurance companies and medical groups (1976). She proposed a 5-year National Health Study be conducted, but it has not come to fruition (1987).

Lee and Westrom (1988) found a dearth of scientific study on teacher health. They reported that most scientific studies pertaining to teacher health during the time span of 1976 to 1987 have centered around stress, burnout, and stress management. As teacher health involves more than stress, Lee and Westrom contend there is little empirical evidence as to the health needs of teachers in the United States.

With this general lack of information on teacher health, it is not surprising to find that most universities have little information about the health of their teaching faculty. There also is little information concerning the health status of various faculty by discipline. No information currently exists as to the average number of days missed by teacher educators in

agriculture for health reasons. There also is no information available which tells us the major health concerns of teacher educators in agriculture. The same is true for factors such as participation in wellness programs, severity of mental and physical health problems, environmental conditions, and other influences pertaining to the health of those who are employed as teacher educators in agriculture. Such information is essential if employing agencies are to maintain an environment which is conducive to good teacher educator health.

PURPOSE AND OBJECTIVES

The major purpose of this study was to initiate the first step in developing and implementing a wellness program for teacher educators in agriculture in the United States. Specific objectives for the study were to:

1. Describe the physical health of teacher educators in agriculture.
2. Determine the severity of the physical health problems experienced by teacher educators in agriculture.
3. Determine the mental health of teacher educators in agriculture.
4. Determine the severity of the mental health problems experienced by teacher educators in agriculture.
5. Examine the perceptions of teacher educators in agriculture toward teacher educator health, health problems, wellness, and their university's concern for teacher educator health.

PROCEDURES

The design for the study was descriptive-correlational. In addition to determining the health status of teacher educators in agriculture, the study was designed to explain differences in health status by examining relationships between various factors. The population for the study was all teacher educators in agriculture in the United States who were employed during the 1987-88 school year. The frame for the study was the 1987-88 list of teacher educators in agriculture that was published by the American Association of Teacher Educators in Agriculture (AATEA).

A random sample of 200 was drawn from the population. This represented slightly over 50% of the total population. As a means of reducing sampling error, the sample was stratified by AATEA region. The size of the sample from each region was proportional to the total number of teacher educators from that region.

Data were collected by mailed questionnaire using methods suggested by Dillman (1978) and others. The instrument for the study was the Educator Health Care Instrument developed by Lee and Westrom at Mississippi State University (1988). Slight adaptations were made to modify the instrument for use in this study. The internal consistency of the instrument in previous studies ranged from .93 to .96 (Lee and Westrom, 1988). For this study, the Cronbach's alpha measure of reliability was .94. The reliability of subgroups of independent variables ranged from .93 to .95. Each item in the instrument was analyzed for its individual contribution toward the total coefficient of consistency. Although each item varied in terms of its contribution, all the items produced a positive increase in the total consistency coefficient.

Content validity of the instrument was established by verification of a panel of experts which included both educational and medical personnel.

After one follow-up, the return rate was 77%. In an effort to determine bias of those who had not responded, a 20% random sample was drawn from the non-respondent population. Individuals in the sample were contacted by telephone and asked to complete the questionnaire. Response rate from this group was 100%. Comparisons between the two groups (respondents and non-respondents) revealed no significant differences. The data were also analyzed by date of return, and no significant differences were found between early and late respondents. As no significant differences were found, the data from all groups were combined for analysis. This produced an overall return rate of 82%.

ANALYSIS OF DATA

Data were analyzed using SPSS/PC+, Version 3.0, on microcomputers in the Department of Agricultural and Extension Education at Mississippi State University. In addition to various descriptive statistics which were used to summarize the data, stepwise multiple regression was used to determine relationships between variables. Dummy variables were used for a number of the multiple regression analyses. An alpha level of .05 was selected for determining significance of the results.

Variables to be used for regression analysis were identified by constructing a correlation matrix for all the variables in the study. Regression models were developed by using independent variables found to be significantly related to each dependent variable. Dependent variables included major health problems experienced and participation in a wellness program. Independent variables included: (a) demographic variables, (b) health related factors, and (c) environmental & related factors. All of the models met the recommended ratio of variables to number of subjects (Barrick, et.al., 1989). The average ratio was 1 variable per 30 subjects.

RESULTS

DESCRIPTIVE ANALYSIS

Demographic data collected from the sample revealed the following information about the sample:

- * 96% were male
- * Average age was 46
- * Average period of time as a teacher educator was 13 years
- * 57% were tenured
- * The most common class load taught was 4-6 hours per semester/quarter
- * 32% were given release time; the most common amount of release time was 25%
- * 72% held major appointments in agriculture; 21% in education
- * 67% were at colleges/universities that require much publishing
- * 55% were at institutions that have a wellness program, but only 17% participate
- * While 40% described themselves as being within normal weight range,

- 59% indicate they are overweight--40% were more than 10 pounds overweight.
- * 68% indicated they ate regular meals with good nutrition; 21% ate irregular meals with good nutrition.
 - * 12% smoke, dip or chew tobacco.

MAJOR HEALTH PROBLEMS

The major health problems experienced by the respondents in 1987-88 were:

1. Colds (75%)
2. Job Stress (61%)
3. Teeth Problems (42%)
4. Fatigue (40%)
5. Headaches (39%)

In terms of average days of work missed, the leading health problems were:

1. Colds (.38 days missed)
2. Influenza (.36 days missed)
3. Major Surgery (.34 days missed)
4. Personal Stress (.28 days missed)
5. Circulatory Problems (.24 days missed)

Top health concerns of the teacher educators were:

1. Job Stress
2. Personal Stress
3. Circulatory Problems
4. Eyesight Problems
5. Digestive Problems

The total average days missed due to all health problems was 2.14 days per teacher educator. The top environment problem identified by the respondents was temperature. Administrative support in terms of maintaining health was given an average rating of 2.2 on a scale of 1 to 5 where 1 = None and 5 = Much. Most comments in response to the question, "How can your administrator assist you with your mental and physical well-being?" dealt with reducing job stress.

REGRESSION ANALYSES

Although the length of this paper prevents listing each regression table, the following summary outlines the best predictors for each of the major health problems as well as participation in a wellness program:

JOB STRESS

44% of the variance was accounted for by:

- * Fatigue
- * Personal Stress
- * Insomnia

PERSONAL STRESS

33% of the variance was accounted for by:

- * Job Stress
- * Depression
- * Headaches

CIRCULATORY PROBLEMS

18 % of the variance was accounted for by:

- * Job Stress
- * Participation in a Wellness Program

EYE PROBLEMS

17% of the variance was accounted for by:

- * Respiratory Problems
- * Minor Surgery
- * Gender (Males tended to experience more eyesight problems)

DIGESTIVE PROBLEMS

12% of the variance was accounted for by:

- * Fatigue
- * Dizziness
- * Skin Problems

COLDS

13% of the variance was accounted for by:

- * Flu
- * Teeth Problems
- * Job Stress

FATIGUE

39% of the variance was accounted for by:

- * Job Stress
- * Temperature Problems
- * Amount of Administrative Help (Negative Relationship)
- * Depression

HEADACHES

17% of the variance was accounted for by:

- * Personal Stress
- * Age (Negative Relationship)
- * Temperature Problems

PARTICIPATION IN A WELLNESS PROGRAM

20% of the variance was accounted for by:

- * Major Surgery
- * Circulatory Problems

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, the authors have developed the following conclusions:

1. As a group, the health of teacher educators in agriculture closely matches that of the U.S. population as a whole. Colds and flu account for the most work days missed, and job stress is now being experienced by a large majority of workers. Most Americans are overweight, and most do not participate in a wellness program (Wellness at the Worksite, 1984).

2. Although their health tends to match that of the general U.S. population, teacher educators in agriculture tend to miss fewer days of work per year due to health problems. (The U.S. average is over 5 days per year, Wellness at the Worksite, 1984.)

3. Most of the factors related to the major health problems experienced by teacher educators in agriculture are emotional or psychosomatic. Of these, the most common are job stress and personal stress. Both job stress and personal stress appear to occur among teacher educators in agriculture without regard to demographic or environmental factors.

4. Teacher educators in agriculture who participate in a wellness program tend to be those who suffer from circulatory problems or have had major surgery.

5. The only demographic variables related to teacher educator health are gender and age. Males tend to have more eyesight problems than females. Younger teacher educators tend to have more headaches than older teacher educators.

6. Stress on the job may well be the major culprit behind many of the illnesses suffered by teacher educators in agriculture in 1987-88. Job Stress is experienced by nearly two-thirds of the teacher educators and is significantly related to colds, circulatory problems, fatigue, personal stress, headaches, and insomnia.

7. Teacher educators in agriculture feel their immediate administrators do little in assisting them in maintaining their mental and physical well-being. This is especially true in terms of reducing job stress.

The major purpose of this study was to indentify ways to improve the health and well-being of teacher educators in agriculture. While it is impossible, from this study, to identify health needs for specific individuals; it is possible to make recommendations for the profession as a whole. The following summary of recommendations is made for the profession based upon the results of this study:

FOR THE TEACHER EDUCATOR

- * Participate in a Wellness Program
 - The benefits of a wellness program are well documented
 - Less than 1 out 5 in the profession currently participate
 - Do not wait until you have a serious illness
 - Participate under the advice of a physician
- * In Addition to Following a Physician's Orders, The Wellness Program Should Be Designed To:
 - Reduce stress
 - Lose weight
 - Reduce fatigue
 - Improve circulation
 - Reduce incidence of colds and flu
- * Stay Home When Ill
 - Profession may be guilty of failing to use sick leave when necessary
 - Coming to work may well increase stress, fatigue, circulatory problems, etc.
- * Utilize Other Methods to Reduce Stress
 - Stress is the #1 concern in profession
 - It is associated with a number of major health problems
 - In addition to wellness programs, investigate activities such as time management techniques, relaxation periods, planned vacations, etc. for reducing stress.

FOR THE ADMINISTRATOR

- * Create an Environment Which Reduces Stress
 - Provide release time for participation in a wellness program
 - Monitor work load of faculty--Be alert to personal problems
 - Encourage faculty to stay home when ill
 - Lend a sympathetic ear to personal problems
 - Insist that faculty take periodic breaks: vacations, relaxation periods, mini-sabbaticals, etc.
- * Strive to Maintain Proper Temperature Control in Building

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HEALTH STATUS OF TEACHER EDUCATORS IN AGRICULTURE:
A NATIONAL STUDY

A Critique

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As health costs escalate, concern about both mental and physical health becomes a top priority. This study thus is of economic importance as well as of human importance.

The study is a good example of an expansion of a study from one group to another. The instrument used to assess the health status of teacher educators was based on one used to assess the health status of agriculture teachers. In both cases the reliability index was high, both for the total instrument and for the subgroups.

I have not seen the instrument and I wonder, did it ask about specific job stresses, such as secretarial problems, overload of extra assignments and not enough support from administrators? The instrument questions appeared to be too general and to use categories that were too large. It would be helpful to know more specific causes of job stress. For example, forty percent of job stress was accounted for by personal stress, fatigue and insomnia, yet personal stress is a large category and insomnia is generally considered an indicator of stress rather than a cause.

The same comment could be made about personal stress. Have the researchers consulted the lists of stressful situations for the general population which include items such as moving, getting married, death of spouse, etc.? Do teacher educators find these stressful in the same degree as the general population? Which stresses are most common among educators?

More space might be given to comparing teacher educators to agriculture teachers and the general population as to mental and physical health. The population as a whole was mentioned in the conclusions but only slightly in the body of the paper.

This study dealt with an important topic and one of great interest. The researchers are to be complimented on their choice of topic.

HIGH SCHOOL AGRICULTURE PROGRAM COMPLETERS AND THEIR SUCCESS IN COLLEGE

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INTRODUCTION

During the last decade the educational reform movement has significantly impacted all aspects of education. Many national and state task forces have addressed the educational crisis. Educators and the various publics have been looking at the traditional values of the American education system. The National Commission on Excellence in Education in its final report, A Nation at Risk: The Imperative for Educational Reform (1983), described the rising tide of mediocrity in our schools and the need to reemphasize the basics necessary for success in life and work in the next century. This report caused vocational programs especially to justify their existence in the schools.

New standards in education, a result of the Excellence in Education movement, required high school students to meet more stringent graduation and college entrance requirements, and usually the new standards did not include vocational education, especially vocational education in agriculture. Many agricultural educators contend the new standards limit the options of students enrolled in high school agriculture programs because these students may be less likely (and in many cases may be unable) to complete the college preparatory curriculum and also sustain their enrollment in secondary agriculture classes.

Cole and Bokor (1989) found that high school curriculum alone is not an adequate predictor of success in a college of agriculture curriculum and degree effort. They also found no difference between the type of high school curriculum (general education, college preparatory, secondary agriculture and combination of agriculture and college preparatory) studied for influencing students' decision to attend college.

Cole and Bokor (1989), however, did find that the high school curriculum studied influenced the choice of a major for college of agriculture students and the college of agriculture students who had secondary agriculture spent less time completing their degrees and changed majors less frequently.

Warmbrod and Doerfert (1987) concluded from their study that secondary agriculture students are less likely to complete a college preparatory curriculum, are just as likely to graduate from college and perform just as well academically in college as do students who do not enroll in secondary agriculture. They also suggested that high school class rank and ACT scores may be better predictors of college success than high school curriculum studied.

It appears from the above and other studies that the type of high school curriculum studied and the resultant college entrance requirements based on high school curriculum prerequisites may not be having the effect on success in college as predicted.

STATEMENT OF THE PROBLEM

The studies cited above focused primarily on the success of secondary agriculture students in colleges of agriculture, where an assumed natural articulation exists. However, how do students, classified as program completers in secondary agriculture, succeed in major and degree programs in colleges other than agriculture? In other words, do students who complete a high school curriculum in agriculture, which may or may not include all the components of a college preparatory curriculum, succeed in college as well as students who did not complete a high school agriculture curriculum? The investigation of the success in college of high school agriculture program completers as compared to the success in college of students not classified as high school agriculture program completers formed the basis of this study.

PURPOSE OF THE STUDY

The purpose of this study was to describe the success in college of secondary agriculture program completers as compared to the success in college of students not classified as secondary agriculture program completers. The following specific research questions were investigated:

1. What differences existed in high school grade point average, high school class rank and SAT or ACT scores between a group of students classified as high school agriculture program completers who have matriculated to a university and a group of students not classified as high school agriculture program completers who have matriculated to the same university?
2. What differences existed in the first semester grade point average and number of credits passed between a group of students classified as high school agriculture program completers who have matriculated to a university and a group of students not classified as high school agriculture program completers who have matriculated to the same university?
3. What differences existed in the retention rate, probation and disqualification rate, cumulative grade point average, average number of credits per semester and graduation rate between a group of students classified as high school agriculture program completers who have matriculated to a university and a group of students not classified as high school agriculture program completers who have matriculated to the same university?

METHODS AND PROCEDURES

POPULATION AND SAMPLE

The Idaho State Division of Vocational Education classifies high school students who have completed Agriculture III and IV as secondary agriculture program completers. The secondary agriculture program completers from 1981-82 through 1987-88 (N=4239) constituted one of the populations of this study. From this population of secondary agriculture program completers, 240 students who had matriculated to the University of Idaho during 1982-83 through 1988-89 were selected as the sample for this study. The selection of the sample of secondary agriculture program completers was assumed to be random.

Students not classified as secondary agriculture program completers and having matriculated to the University of Idaho during 1982-83 to 1988-89 constituted the second population of this study. A random stratified sample (n=1235) was chosen from this population and was used as the comparison group. The sample was stratified across the matriculation years of 1982-83 to 1988-89. The University of Idaho's Management Information Services selected the samples of the study.

COLLECTION OF DATA

The data reported in this study were supplied by the University of Idaho's Management Information Services from the University's Student Records System.

ANALYSIS OF DATA

The data from the two samples of students were analyzed using analysis of variance (ANOVA) for an unequal number within groups to test for differences between the two groups. The subgroups (matriculation year) of the samples contained different numbers of observations due to missing data in the Student Records System. The computer program, Statistical Analysis Systems (SAS, procedure (PROC GLM) was used. An alpha level was set at 0.05.

If no significant differences between the two samples of students were found the conclusion was to be that the two samples were selected from the same population.

FINDINGS AND DISCUSSION

The investigators had expected to find significant differences between the two samples of students in this study based on the fact that credit in secondary agriculture had been disallowed toward the high school graduation requirements and toward the requirements for admission to the universities and colleges of the state. The investigators further assumed that since the credit in secondary agriculture was no longer accepted for admission into the universities and colleges, those high school students completing a secondary agriculture program would be less prepared for college work and would achieve differently than students not completing a secondary agriculture program.

QUESTION 1

No significant differences at the 0.05 level were found between the secondary agriculture program completers and non-completers on the high school related variables of high school GPA, high school class rank percentile, ACT Composite score, SAT Mathematics score and SAT Verbal score (Table 1).

TABLE 1

High school variables, means, f-values and the probabilities of the f-values being due to chance or error when comparing secondary agriculture program completers and non-completers.

Variables	Completers	Non-completers	F-value	Probabilities
	<u>Mean</u> n	<u>Mean</u> n		
High School GPA	3.21 139	3.14 592	2.21	0.1375
High School Rank (Percentile)	31.04 193	32.17 853	0.37	0.5442
ACT Composite	20.22 222	20.90 878	3.15	0.0761
ACT English	18.34 222	19.68 878	14.99	0.0001 *
ACT Mathematics	18.15 222	19.45 878	6.43	0.0113 *
SAT Mathematics	485.56 27	491.24 299	0.07	0.7890
SAT Verbal	447.78 27	466.56 299	0.85	0.3583

* Significant

However, significant differences at the 0.05 level were found for the variables of ACT English score and ACT Mathematics score. The non-completers scored higher than the secondary agriculture program completers.

QUESTION 2

When the two samples of students were compared on the variables of first semester credits and first semester GPA, no significant differences were found (Table 2). No attempt was made to ascertain the type of credit (core, college or major) the students attempted or earned.

TABLE 2

First semester variables, means, f-values and the probabilities of the f-values being due to chance or error when comparing secondary agriculture program completers and non-completers.

Variables	Completers	Non-completers	F-value	Probabilities
	<u>Mean</u> n	<u>Mean</u> n		
First Semester Credits	13.41 157	13.58 739	0.63	0.4266
First Semester GPA	2.49 157	2.46 739	0.23	0.6286

QUESTION 3

When the two samples of students were compared on the variable of retention, a significant difference at the 0.05 level was found for the percent of students that returned to the university for their second and third year (Table 3). The percent of secondary agriculture program completers returning for their second and third year was significantly less than the percent of non-completers returning.

However, when the two groups of students were compared on three variables indicative of academic problems (referral to the dean, academic probation and academic disqualification), no significant differences were found between secondary agriculture program completers and non-completers. Even though the secondary program completers had a lower retention rate, the difference was not due to academic probation or disqualification.

Readers should note that the number of total observations in each sample used for the comparison of credits earned per semester and cumulative GPA is greater than the number used for the retention variables. Part of the difference is due to missing data and part is due to students returning to the university after dropping out for some time.

A significant difference in the number of credits earned per semester was found; the secondary agriculture program completers earned less credits per semester than did the non-completers.

No significant difference, though, was found when the samples were compared on the variables of cumulative GPA and graduate rate in 5 years or less.

TABLE 3

Continuing student variables, means, f-values and the probabilities of the f-values being due to chance or error when comparing secondary agriculture program completers and non-completers.

Variables	Completers	Non-completers	F-value	Probabilities
	<u>Mean</u> n	<u>Mean</u> n		
Percent Returning Year Two	66 179	75 774	6.64	0.0101 *
Percent Returning Year Three	54 152	65 681	6.99	0.0084 *
Percent Referred to Dean	02 179	02 774	0.00	0.9973
Percent Placed on Probation	01 179	01 774	0.07	0.7909
Percent Disqualified	02 179	01 774	0.89	0.3453
Credits Earned per Semester (Retained Students)	14.84 157	15.54 739	4.29	0.0387 *
Cumulative GPA (Retained Students)	2.50 157	2.46 739	0.30	0.5843
Five Year or Less Graduation Rate (Retained Students)	0.32 80	0.30 419	0.27	0.6043

* Significant

CONCLUSIONS

Since no significant differences between the secondary agriculture program completers and non-completers were found when the two groups were compared on the variables of high school GPA, high school class rank percentile, ACT Composite score, SAT Mathematics score, SAT Verbal score, first semester credits earned, first semester GPA, academic probation rate, academic disqualification rate, cumulative GPA, and graduation rate, the investigators concluded the samples of this study were drawn from the same population.

While significant differences between the secondary agriculture program completers and non-completers were found when the two groups were compared on the variables of ACT English score, ACT Mathematics score, retention rate and credits earned per semester, the combination of differences and variables are

such that they do not change the investigators' conclusion that the samples of this study were drawn from the same population.

IMPLICATIONS

Based on the findings and conclusions of this study, the investigators identified the following implications:

1. If secondary agriculture credit was excluded from the list of high school credit accepted for admission to colleges and universities because it was perceived that students enrolling in the program were less prepared for college or were less successful in college, the findings of this study seems to indicate just the opposite. Perhaps, the requirements for admission to college should be revised in light of current information.
2. If secondary agriculture is not accepted for admission to the state's colleges and universities, the future potential secondary agriculture program completers will have to decide whether to enroll in agriculture rather than other subjects based on information not consistent with the findings of this study. In the opinion of the investigators, this will be an unfortunate situation for high school students interested in secondary agriculture and college and those secondary agriculture programs that will lose quality students and further skew the program with students who do not have the ability to be successful in college. The students remaining in the secondary agriculture programs will also lose quality association.

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HIGH SCHOOL AGRICULTURE PROGRAM COMPLETERS
AND THEIR SUCCESS IN COLLEGE

A Critique

J. Dale Oliver, Virginia Tech--Discussant

Increasingly, concerns are being expressed about college-bound students enrolling in agricultural education programs in high schools. The researchers have attempted to address this concern by determining if students who complete a high school curriculum in agriculture succeed in college as well as students who did not complete a high school agriculture curriculum. The authors have provided a succinct review of the literature and the introduction leads into a clear statement of the problem. The purpose of the study and the research questions are clearly stated.

In describing the population and sample, the authors assumed the selection of the sample of secondary agricultural program completers was random. Actually, it was a self-selected sample and I seriously doubt it was random. Perhaps a better assumption would be that it was a representative sample over time of program completers. In selecting the sample of students not classified as program completers, the assumptions underlying the sample size determination should be stated. The GLM procedure from the Statistical Analysis System was used in the data analysis and it would be helpful if the authors included a reference on this procedure and briefly noted why it was used.

In the analysis of data section the authors stated, "If no significant differences between the two samples of students were found the conclusion was to be that the two samples were selected from the same population." It seems to me that a clearer and more forceful conclusion would be that if no significant differences were found program completers were as successful in college as noncompleters. This would lead to an implication that students can complete agriculture programs and still prepare for college.

I commend the researchers for exploring a critical problem and feel the results support the enrolling of college-bound students in high school agricultural programs.

HIGH SCHOOL STUDENTS' PERCEPTIONS OF AGRICULTURE AND CAREERS IN AGRICULTURE

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INTRODUCTION

Agriculture is America's foremost basic industry. Approximately 23 million people, 1 in 5, work in agriculture or related fields. Twenty percent of the gross national product is related to the industry of agriculture. In Idaho, agriculture is even more prominent; it is the basic industry. Agriculture in Idaho supplies more than half of Idaho's gross product and employs more than one third of its labor force. Because of the importance of agriculture to the nation and state, having an adequately educated work force in agriculture is essential.

The Human Capital Shortages Task Force (1988) wrote the following about the nation's food and agricultural system:

The expertise base which supports the U.S. food and agricultural system is seriously eroded and must be revitalized. Strategically, our nation's security is clearly dependent upon the requisite expertise to conduct the science and business of producing and distributing our future food while carefully managing our natural resources.

Today's young adults are strongly influenced by expected economic rewards associated with career alternatives. Also, our society's macro issues, ephemeral lifestyles, and occupational images projected by the mass media have a major impact on career decisions of adolescents. Therefore, food and agricultural career information and recruitment initiatives must deal with these megaforges. p. 3

Supplying a well-trained work force for agriculture is a primary goal of agricultural education. Instruction at the secondary, post-secondary, college and adult level is critical in meeting the needs of agriculture in the future.

In the report Future Directions for Secondary Agricultural Education in Idaho, (1986), two trends were identified regarding agriculture's image:

1. The negative agriculture economy has reduced student interest in secondary agricultural education.
2. The perception that an agricultural education leads only to production agriculture, farming or ranching, has reduced student interest in secondary agricultural education. p. 15

Since the release of the report A Nation at Risk in 1983, the educational reform movement has had a major impact on many aspects of education. Secondary agricultural education is receiving reduced emphasis, whereas, education in English, reading, mathematics, humanities and science is receiving increased emphasis.

These factors, the image of agricultural careers and the change in educational emphasis, are believed to have seriously impacted secondary agricultural education enrollment in Idaho.

STATEMENT OF THE PROBLEM

The future need of our nation and state for individuals with an education in agriculture and the opportunities for individuals with an agricultural education background has been well documented.

Agricultural education programs, at the secondary as well as other levels, will not be able to prepare the agriculturists needed in the future if young people do not have an interest in the career field. Also, secondary agricultural education will not be as readily available to the few interested youth because of the critical mass required in order to offer a complete program efficiently and effectively.

If one ponders the future of secondary agricultural education and the education of the nation's agriculturists, the following questions come to mind. What picture enters the mind of the adolescent when he/she sees the word agriculture? Do adolescents know what agriculture is? Are high school students considering a career in agriculture? What reasons do students give for their interest (or lack of interest) in pursuing a career in agriculture? Do adults employed in agriculture know how students perceive their career field? Is the public's and students' view of agriculture having an effect on the type and quality of student entering the agriculture profession? Are students receiving adequate factual information so they can make intelligent decisions about pursuing a career in agriculture?

PURPOSE OF THE STUDY

This study was conducted to determine how high school students perceive the industry of agriculture and the related career opportunities. The specific objectives of the study were:

1. To determine the perceptions of agriculture held by high school students.
2. To determine the perceptions of pursuing a career in agriculture held by high school students.
3. To identify factors contributing to the perceptions of agriculture and pursuing a career in agriculture held by high school students.

METHODS AND PROCEDURES

POPULATION AND SAMPLE

The population of this study was sophomore and junior high school students from four Magic Valley high schools: Filer, Hagerman, Kimberly, and Twin Falls. These schools were chosen for their enrollment size differences, 90 (grades 9-12) to 1400 (grades 10-12) and community differences. The three smaller schools are mostly rural and the larger school mostly urban. The economic base of all four school communities is agriculture.

The subjects selected as the sample of this study were either sophomores or juniors enrolled in a high school English class. In the three smaller schools, the whole sophomore or junior class was chosen, whereas, in the larger school, several English sections were randomly selected. The sample totaled 195 students.

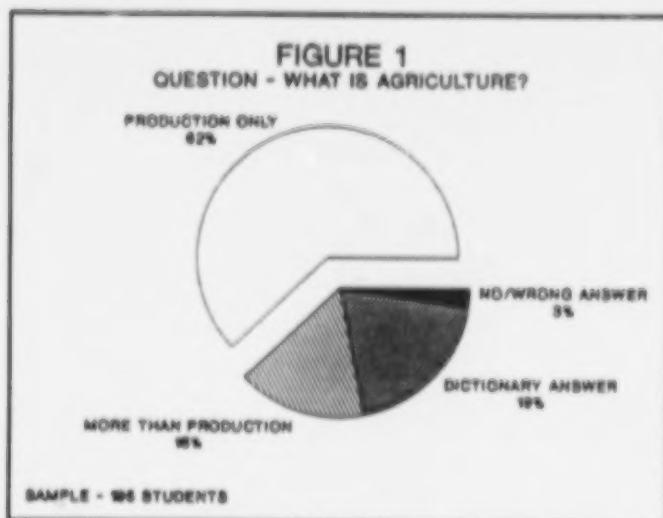
DEVELOPMENT OF QUESTIONNAIRE

Traditionally, much of the field research concerning students' perceptions of careers has been accomplished by gathering data via fixed response questionnaires. The perceptions of the investigator(s) may have an influence on the responses selected. In this study, the investigators identified an open-ended questionnaire as the best instrument to collect the data.

think. Agriculture has much to offer, not just farming, but computer programmers, scientist and a variety of other specialists. As you can very well see agriculture isn't just for someone who wants to farm.

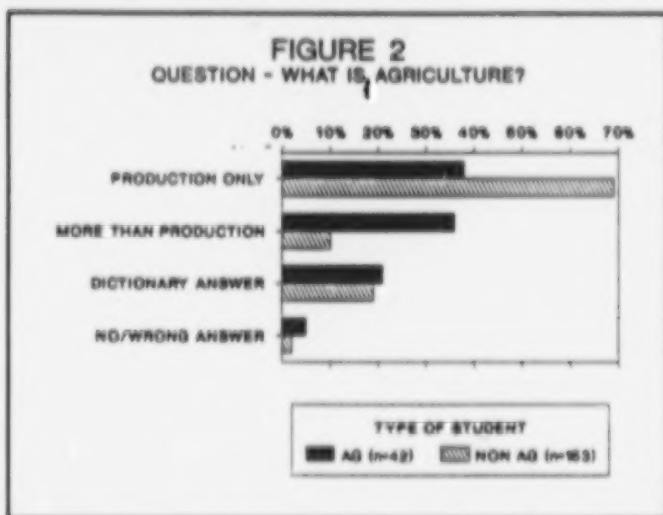
DICTIONARY DEFINITION

Agriculture is the science and art of cultivating the soil, producing crops and raising livestock and in varying degrees the preparation of these products for man's use and their disposal.



Sixty-two percent (121) of the respondents indicated that agriculture was production only, with many using the words "farming or ranching" to describe agriculture (Figure 1). Sixteen percent (31) of the respondents suggested agriculture was more than production agriculture. Nineteen percent (38) used the dictionary definition while 3 percent (5) of the responses could not be classified.

Of the respondents enrolled in secondary agriculture classes, percent (16) answered that agriculture was production only, while 36 percent (15) answered that it was more than production agriculture (Figure 2). Of the respondents not enrolled in agriculture classes, 69 percent indicated that agriculture pertained to production only.



QUESTION 2. WHAT IS YOUR OPINION OF PURSUING A CAREER IN AGRICULTURE?

The responses to Question 2 were classified into four categories: positive opinion, negative opinion, OK for someone else/not for me and other.

Almost 60 percent (115) of the responses were classified as negative toward pursuing a career in agriculture (Figure 3). Twenty-two percent (43) of the responses were classified as positive toward pursuing a career in agriculture. Eleven percent (22) of the responses were classified as OK for someone else/not for me. Seven percent (13) of the responses could not be classified.

Almost two-thirds (23) of the secondary agriculture students expressed a positive opinion toward pursuing a career in agriculture (Figure 4). Of the

Three open-ended questions were developed and reviewed by faculty in the Department of Agricultural and Extension Education at the University of Idaho. Questionnaire revisions were made using faculty recommendations. The revised questionnaire and instructions for administration were field-tested using a high school sophomore class not related to the population of this study.

COLLECTION OF DATA

The investigators invited English teachers in each school to administer the questionnaires. Instructions were developed for the English teachers administering the questionnaires and the instructions were based on the guidelines of the Idaho State Proficiency Writing Exam, which must be taken by all high school juniors in the state. The investigators explained the study procedures to the selected English teachers to insure consistent instructions. The questionnaires were administered in all four schools in late March, 1988 as part of a series of writing practices.

A copy of the completed questionnaires were sent by the English teachers to the Department of Agricultural and Extension Education for transcription of the responses. Each student's response was coded with a number, so responses would be evaluated without the identity of the respondent. Only after the responses were analyzed were numbers and names used to identify students enrolled in secondary agriculture classes.

ANALYSIS OF DATA

The data were analyzed using the following procedures:

1. After reviewing the transcribed responses, the investigators collectively established classification categories for each question.
2. Each investigator categorized the responses into the established categories. A consensus of the investigators was reached on each response.
3. Respondents were identified as to enrollment in secondary agriculture.
4. Data were reduced into frequencies.
5. Responses were selected for inclusion in this report to aid readers of this report understand the classification categories.

FINDINGS AND DISCUSSION

One hundred ninety-five (195) students completed the questionnaire. Sixty-two (62) (32%) of the respondents were from Filer, 24 (12%) from Hagerman, 48 (25%) from Kimberly and 61 (31%) from Twin Falls. Of the 195 respondents, 42 (22%) were enrolled in a secondary agriculture program.

QUESTION 1. WHAT IS AGRICULTURE?

The responses to Question 1 were classified into four categories: production agriculture only, more than production agriculture, dictionary answer and no or wrong answer.

Responses selected as typical for each category were:

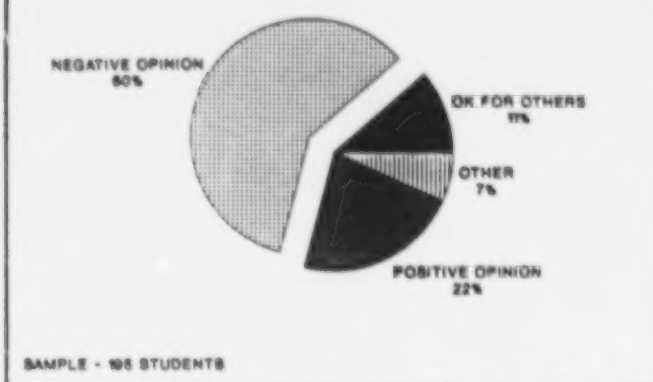
PRODUCTION AGRICULTURE ONLY

Agriculture is the study and process of farming. When most people think of agriculture, they think of farming; cutting wheat, harvesting hay, and digging potatoes. But that's not true, it also includes weeding beets.

MORE THAN PRODUCTION AGRICULTURE

Agriculture is a very broad subject, ranging from farmers out in the field, to the scientist in the lab. There is much more to agriculture than people

FIGURE 3
OPINIONS OF CAREER IN AGRICULTURE



students not enrolled in secondary agriculture, 84 percent (102) expressed a negative opinion of pursuing a career in agriculture.

The following responses to Question 2 were selected as examples of positive and negative opinions of pursuing a career in agriculture.

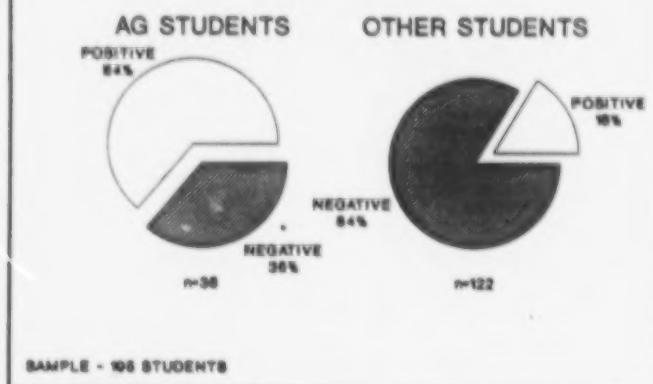
POSITIVE

I think a job involved with agriculture would be quite educational and a good learning experience. The farmer has to have much responsibility because it takes a lot of hard work and time. It is an important job and a very needed one. I would like to pursue a career in agriculture. There are many diverse fields in this job. A few are: agribusiness, horticulture, livestock management, agricultural mechanics, animal and plant science and great many others. I would like to be engaged in a job that deals with helping and a way of life.

NEGATIVE

I have done farm work, farmers are always in debt. They all drive new trucks and cars, but they gripe because they need new farm equipment. I don't want the hassle.

FIGURE 4
OPINIONS OF CAREER IN AGRICULTURE



I think to pursue a job in agriculture you need a strong back and a weak mind. In today's economy a guy would be foolish to become a farmer. The farming industry is in bad shape right now and I wouldn't touch a job in agriculture with a ten foot pole. It's becoming harder and harder to make a living in agriculture especially as a farmer. I think that I'm never going to pursue a job in agriculture.

Agriculture, in my opinion, is not the occupation I could pursue when I get older. To me, agriculture reminds me of a loser job. A field of work that is low in the money making category and takes almost no brains and working skills. An occupation which is not interesting and full of hard work with very little rewards.

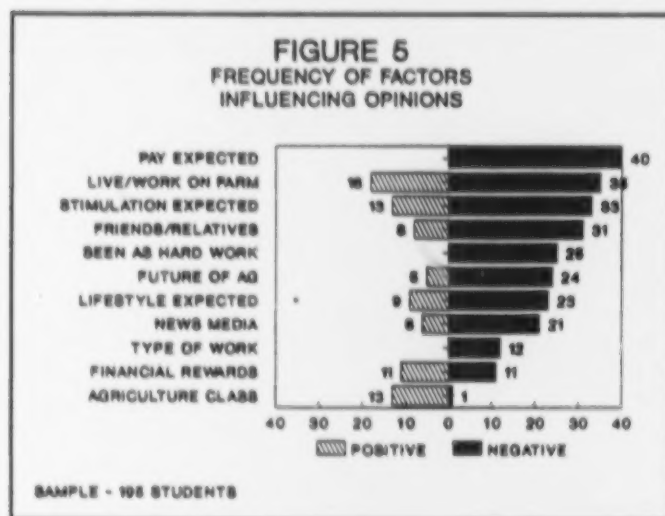
I don't want a job in agriculture. If I pursued an agriculture career I would probably end up wearing coveralls and a flannel shirt and talking funny. It is pretty much a no win job.

Agriculture is a fancy name for the people in cowboy hats, old jeans, dusty Tony Lama boots, flannel shirts and a straw stalk in their teeth. These people put seeds in the ground, water and take care of them and put all their work into it and then go broke when they try to sell at a low market, unless they grow narcotics and then they make a killing.

QUESTION 3. WHAT FACTORS HAVE INFLUENCED YOUR ANSWER TO THE ABOVE QUESTIONS?

Responses to Question 3 were classified in two steps. If the student's responses to Question 1 and 2 were classified as positive, then so were the factor(s) identified in the response to Question 3. If the student's responses to Question 1 and 2 were classified as negative, then so were the factor(s) identified in the response to Question 3. In the few cases where a student's responses to Question 1 and 2 were both positive and negative, an attempt was made to classify the factors identified in the response to Question 3 as influencing either the response to Question 1 or the response to Question 2.

The responses to Question 3 were classified into the following 11 factor groups: agriculture class, financial rewards anticipated, lifestyle expected, type of work expected, future of agriculture, friends/relatives, seen as hard work, stimulation expected from career, idea of living and working on a farm, pay expected and, news media.



Because the determination of a particular factor as being a positive or negative influence on the respondent's perception of what agriculture is and his/her opinion of pursuing a career in agriculture was based on whether the responses to Question 1 and 2 were positive or negative, it follows that the factors were predominantly classified as negative (Figure 5).

All of the factors identified influenced opinions negatively, led by pay expected, living/working on a farm, stimulation expected and friends/relatives, whereas, only 8 of the 11 factors influenced opinions

positively. The factor, agriculture class, was cited as a negative influence only 1 time.

CONCLUSIONS

Based on the findings of this study, the following conclusions were formed:

1. Students in the population represented by the sample of this study have a very inadequate perception of what constitutes the industry of agriculture. The students perceive agriculture as farming and ranching only. Little evidence exists to suggest the students have factual information on which to base their perceptions. Informed decisions about education in agriculture or a career in agriculture can not and will not be made by students having such an inadequate knowledge base.
2. Students in the population represented by the sample of this study have a pervasively negative opinion of pursuing a career in agriculture. If only

22 percent of the students have a positive opinion of pursuing a career in agriculture, the potential pool of future agriculturists is inadequate. It would seem the students are expressing an opinion of pursuing a career in farming and ranching; this conclusion is based on what the students perceive the industry of agriculture to be.

3. The factors identified to be influencing students' opinions deal almost exclusively with production agriculture. The factors classified as negatively influencing opinions are popularly held perceptions about a career in production agriculture. It may be the factors cited by the students are a result of the experiences the students have had in terms of high school jobs and information assimilated from their environment; it would seem the students have not been exposed to factual information about the industry of agriculture and its associated careers.
4. Enrollment in high school agriculture classes has a positive and an information correcting influence on the students' perceptions of agriculture and opinions of pursuing a career in agriculture. However, the impact is less than expected. This may in part be due to the production oriented nature of many traditional secondary agriculture programs.
5. Food and agricultural career information and recruitment initiatives must indeed deal with megaforges.

RECOMMENDATIONS

Based on the conclusions of this study, the following recommendations are offered to those responsible for food and agricultural career information and recruitment initiatives:

1. Students must be provided with a realistic and factual picture of the industry of agriculture. School administrators, teachers and counselors must be expected to accept part of this responsibility, just as they are expected to accept the responsibility for education in the basics. Agriculturists of today must assist with this initiative.
2. The frightening picture drawn by the results of this and similar studies must be shown to all agriculturists and educators in agriculture in such a fashion and with such tenacity that they will be moved into action to correct the situation with more than mere "lip service".

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HIGH SCHOOL STUDENTS' PERCEPTION
OF AGRICULTURE AND CAREERS IN AGRICULTURE

A Critique

Thomas L. Grady, University of Wisconsin-Madison--Discussant

This paper addressed a continual concern and interest by many in agriculture and education. It is particularly timely as described by the host of statistical information contained in the introduction. A well-supported description of the economic and occupational status of agriculture in the state and nation is given. The case is made that agriculture urgently needs to restore its occupational expertise base in both quantity and quality.

The objectives were clearly stated and reflect the overall purpose of the study. It is evident that the researchers gave a good deal of attention to sampling, instrumentation, data collection, and analysis. The article was well-organized, well-written, and data were clearly displayed in charts and graphs.

While the study is put together well, several suggestions for improvement seem appropriate. When categorizing responses to question one, I was unclear about how the distinction was made between responses to the "production agriculture only," more than "production agriculture," and "dictionary definition" categories. The "dictionary definition" category seems to overlap with the other two such that accurate categorization would be difficult. A further explanation of what this category means and how responses were placed in it would be helpful.

Some conclusions and statements seem to be taken out of the context of the findings. Conclusion one indicates students have inadequate perception of agriculture. Also mentioned is that they have had no factual evidence on which to base their perceptions. There is a difference between factual and inadequate information. Their perceptions may be based on fact, but not all the facts. They may have inadequate information, but still have factual information. According to conclusion two, the statement that the potential pool of future agriculturists is inadequate is based on twenty-two percent of the students who had a positive opinion of pursuing a career in agriculture. While twenty-two percent may seem small, there is no evidence for comparison to suggest that this percentage would be inadequate. If all twenty-two percent entered occupations in agriculture, it may be very sufficient for most employment demands, depending on what the occupation is. In my estimation, conclusion two is unwarranted. The same concern I expressed about conclusion one also holds for conclusion three. The student may indeed have been exposed to factual information, but not a breadth of information. Conclusion four is a statement of cause and effect that cannot be made from the findings of this study. Another possible explanation for this could be that the students entering high school agriculture classes already had a positive opinion toward careers in agriculture. Finally, the fifth conclusion is ambiguous and needs clarification.

The recommendations seem to be stated in the context of agriculture broadly, when data came from only four schools and 195 respondents. While we may feel strongly about what ought to be done and how agriculture should be viewed, it is my opinion that the scope of the findings restricts the breadth to which the comments can be made in this study.

**IDENTIFICATION OF TEACHING TECHNIQUES, STRATEGIES AND
STYLES FOR USE WITH SPECIAL NEEDS STUDENTS ENROLLED IN
VOCATIONAL AGRICULTURE**

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Industry Education/Project Development
Intermediate Unit # 25 -
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INTRODUCTION

Vocational education for special needs students has had legislative and philosophical support since the passage of the Vocational Education Act of 1963 as amended in 1968. Further support came with the passage of the "Education For All Handicapped Children Act" (PL 94-142) in 1975. This law required that local public school districts locate and identify all handicapped children in need of special education and related services and to provide those services as guaranteed by the law. The Carl D. Perkins Act of 1984 (PL 98-524) provided for vocational education services and activities designed to meet the special needs of handicapped and disadvantaged students.

From data reported by Baggett, Scanlon and Curtis (1985), five out of every six vocational agriculture programs in Pennsylvania have at least one handicapped student enrolled, with one of every six programs reporting ten or more handicapped students enrolled. Their study also reported eight common problems faced by educators in dealing with mainstreamed students. The highest ranked problems were indicated to be class size, curriculum modification and lack of training.

Wang and Walberg (1983) coined the phrase "adaptive instruction" which is defined as "the use of alternative instructional strategies and school resources to provide learning experiences that meet individual needs" (p. 603). Wang, Rubenstein and Reynolds (1985) indicated that quantitative research has shown that adaptive instruction greatly improves student learning. An adaptive program has at least one of the following characteristics: (1) instruction is based on assessed student abilities; (2) students work at their own pace; (3) students receive periodic reports of their mastery; (4) alternative materials and activities are provided; (5) students have a choice of goals and activities; (6) students plan and evaluate their own learning; and (7) students help one another achieve individual goals.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify teaching techniques, strategies, and styles that enhance learning by special needs students enrolled in Pennsylvania vocational agriculture.

Specific Objectives

1. To determine educational gain of special needs students of participating teachers by comparison of pretest and posttest scores.
2. To observe the total classroom environment of successful teachers in order to develop a profile of characteristics of the successful teacher and his/her

teaching environment.

PROCEDURES OF THE INVESTIGATION

The design selected for this study was ex-post facto, modified pretest-posttest design with criterion groups, special needs students and regular, non-special needs students. There were two parts to the study. Part One was designed to determine educational gain of special needs students enrolled in programs of participating teachers; results of Part One were used to carry out Part Two, a series of observations designed to identify techniques, strategies and styles.

The dependent variable was student achievement measured by increase in mean scores between tests. The independent variable was the overall classroom environment. In addition, there were five active moderator variables: (1) classroom physical environment; (2) teacher strategies, both overt and monitoring; (3) teacher personality and style; (4) instructional materials; and (5) instructional activities and organization.

Data Collection

A 50 percent stratified random sample of all Pennsylvania vocational agriculture teachers, based on the percent of special needs students enrolled in all schools in the three geographical regions of the state, was drawn (VEMIS, 1980). The large sample (50%) was needed to insure sufficient numbers of participating teachers. Students of these teachers were used as subjects. Human subject clearance was obtained for all participants.

An instrument was developed and reviewed by a panel of experts to determine content validity. Based on the Fry Index, readability was determined to be "2" or second grade. Sixty-four teachers administered a 25-item pretest of general agricultural knowledge to first-year vocational agriculture students. Pretest data were processed to determine the reliability of the test instrument. The Kuder-Richardson 20 Reliability Coefficient (KR-20) for the pretest was 0.65. The researcher decided to eliminate pretest data from any calculations to determine educational gain due to the unacceptable reliability coefficient of the test instrument.

Fifteen questions were added to the posttests to insure a wider range of difficulty to increase the reliability of the pretest instrument. Two posttests were administered for purpose of determining educational gain. Only scores of students classified as learning disabled or physically and/or emotionally handicapped were used as these students were classified by their school districts. All 40 questions were randomly arranged for Posttest-1. No format revisions were made to the instrument prior to its administration as Posttest-2; buff colored paper was used for its duplication.

A KR-20 was calculated for revised Posttest-1. Item analysis yielded low discrimination values for seven questions; these were eliminated from all calculations and statistical comparisons. The KR-20 reliability coefficient for the 33 remaining items used for data analysis was calculated to be 0.74. This was considered acceptable based on Tuckman (1985).

Seven teachers were identified as the top ten percent based upon an increase in mean scores of special needs students. After calculations of net mean

increases (or decreases) for all teachers with learning disabled or physically and/or emotionally handicapped students who participated in both posttests, participants were placed into two groups: the top ten percent based on net mean increases and all others. A t-test conducted to determine the significance of the difference in net scores of the two groups yielded a significant difference ($t=6.54$, $p<0.001$) among teachers in regard to educational gain between Posttest-1 and Posttest-2.

The second assessment of classroom learning was accomplished through on-site observations of the top ten percent teachers. Observation instruments designed to assess the overall classroom environment were developed and field tested at four vocational agriculture departments in Pennsylvania. Based on the field-testing data, revisions were made to the instruments before use for the actual study. Results of the observations yielded a profile of teaching techniques, strategies and styles which are characteristics of teachers who worked successfully with special needs students.

ANALYSIS OF DATA

A significance level of 0.05 was established for all statistical calculations using inferential statistics. Characteristics of the successful teacher were identified using the following criteria:

1. Instruments on which data was recorded as "frequent use," "some use," or "no use": The item was characteristic if greater than 65.0 percent of the observations were recorded as "frequent use" or if the combination of "frequent use" and "some use" was greater than 80 percent.

2. Instruments on which data was recorded as "yes, is used" or "no, is not used": The item was characteristic if greater than 50 percent of the observations were recorded as "yes, is used."

3. Teacher personality and style: A score of 80.0 or more indicated a high level of a characteristic, 70.0-79.9 indicated a moderate level and 60.0-69.9 indicated some level of a characteristic.

RESULTS OF OBSERVATIONS

Classroom Physical Environment

Data analysis indicated that of the ten items listed as characteristics of a good, safe learning environment (Bear & Hoerner, 1978), seven items fit established criteria as practically different. Two-thirds of the lesson situations observed were in rooms organized appropriately for the lesson, had appropriate lighting and had tools and/or equipment stored according to the design of the shop or classroom. Expendable materials and supplies were stored safely in 62.5 percent (frequently) of the lesson situations, with 31.3 percent of them having some proper storage and 6.2 percent having none. In addition, while hazardous materials were observed as properly stored and labeled frequently during only 55.6 percent of the observations, 44.4 percent had at least some proper storage and labeling of those materials (Table 1).

Teacher Strategy

Five of the 13 teacher strategies investigated were considered overt characteristics of the successful teacher based on established criteria. In two-thirds of the classes observed, teachers asked simple questions frequently,

conducted classroom discussions instead of lectures, and performed classroom or laboratory demonstrations. In 59.3 percent of the lessons observed, teachers utilized self-paced laboratory activities or tasks. Silent reading by the student was required frequently during 44.5 percent of the lessons, and some during 37.0 percent of the lessons observed (Table 2).

Table 1

Characteristics of the Classroom Physical Environment of the Top 10% Teachers

Environmental Conditions	<u>Frequent Use</u>		<u>Some Use</u>		<u>No Use</u>	
	%	N	%	N	%	N
1. Appropriate organization for lesson	85.7	12	14.3	2	0.0	--
2. Appropriate lighting for lesson	76.5	13	23.5	4	0.0	--
3. Proper storage of tools/equipment	66.7	8	33.3	4	0.0	--
4. Safe storage expendable materials	62.5	10	31.3	5	6.2	1
5. Area free from distracting sounds	62.5	10	18.8	3	18.8	3
6. Proper storage hazardous materials	55.6	5	44.4	4	0.0	--
7. All students can see teacher, etc.	28.6	4	57.1	8	14.3	2

Note: Any situations non-applicable were not considered in calculations;
N=Number of Observations

Table 2

Characteristic Overt Teacher Strategies of the Top 10% Teachers

Instructional Strategy	<u>Frequent Use</u>		<u>Some Use</u>		<u>No Use</u>	
	%	N	%	N	%	N
Asks simple questions	74.1	20	22.2	6	3.7	1
Utilizes discussions	66.7	18	11.1	3	22.2	6
Performs demonstrations	66.7	18	22.2	6	11.1	3
Self-paced activities	59.3	16	22.2	6	18.5	5
Silent reading by student	44.5	12	37.0	10	18.5	5

Note: N=Number of Observations

Almost all teachers gave immediate feedback in all lesson situations. In two-thirds of the classes, teachers observed practice activities of the students and re-taught content, tasks or skills as necessary. Teachers evaluated small tasks frequently in 63.0 percent of the lessons observed (Table 3).

Teacher Personality and Style

Based on data analysis of observations of the top ten percent teachers, all teachers possessed a high degree of organization and dynamism and were very warm and accepting of students. They were moderately creative and exhibited some degree of flexibility (Table 4).

Instructional Materials

Based on established criteria, six types of instructional materials were used frequently by the successful teacher. More than 80 percent of the lesson

situations observed involved the use of workbooks and teacher-prepared worksheets. In 77.8 percent of the lessons, tools and machinery were being used for hands-on activities at some point during the lesson. Two-thirds of the teachers used visual aids and handouts prepared by them for student use. Laboratory expendable materials such as wood, metal, or paint were used in 59.3 percent of the lessons observed, along with laboratory task or skill sheets (Table 5).

Table 3
Characteristic Monitoring Actions of the Top 10% Teachers

Monitoring Action	<u>Frequent Use</u>		<u>Some Use</u>		<u>No Use</u>	
	%	N	%	N	%	N
Gives immediate feedback	88.9	24	7.4	2	3.7	1
Observes practice activities	66.7	18	25.9	7	7.4	2
Re-teaches, if necessary	66.7	18	25.9	7	7.4	2
Evaluates small tasks	63.0	17	18.5	5	18.5	5
Questions volunteers	44.5	12	40.7	11	14.8	4
Questions nonvolunteers	29.6	8	55.6	15	14.8	4

Note: N=Number of Observations

Table 4
Analysis of Teacher Personality and Style

Characteristic	Mean Rating*	Standard**
Organized Demeanor	81.26	82.93
Dynamism	80.00	62.07
Flexibility	65.28	None Given
Warmth and Acceptance	92.07	77.28
Creativity	79.44	61.44

*100.0-80.0+=high degree, 70.00-79.99=moderate degree, 60.00-69.99=some degree.

**From Tuckman, B.W. and Fabian, M.S. (1977), p.8

Instructional Activities and Organization

Data analysis identified six activities as characteristic of those selected by the successful teacher. In all (100.0%) of the lesson situations, students were required to listen to the teacher, whether during classroom discussion or small-group instruction. Most lessons observed (70.0%) involved construction, experimentation or manipulation on the part of the students, as well as writing on programmed materials such as worksheets or workbooks. In two-thirds of the classrooms, students took notes, usually in the form of short margin notes or as an addition to worksheets or handouts. Sixty-three percent of the lessons involved student reading of task or skill sheets, while 55.6 percent of the lessons involved student reading of short passages of textual materials (Table 6).

Summary of Findings

Based on these data, vocational agriculture teachers who work successfully with special needs students were highly organized and creative, generally warm and accepting, and stressed practical application of skills learned by hands-on

experience. These teachers were dedicated to teaching and prepared much of their own materials, particularly task sheets and worksheets. Self-paced activities were used frequently. During the instructional process, the successful teacher observed practice activities, graded small tasks and gave immediate feedback.

Table 5
Instructional Materials Used Frequently by the Top 10% Teachers

Instructional Materials	<u>Used</u>		<u>Not Used</u>	
	%	N	%	N
Workbooks and worksheets	81.5	22	18.5	5
Tools and/or machinery	77.8	21	22.2	6
Photographs/drawings/transparencies	66.7	18	33.3	9
Teacher-prepared handouts	66.7	18	33.3	9
Laboratory expendable materials	59.3	16	40.7	11
Laboratory task/skill sheets	59.3	16	40.7	11

Note: N=Number of Observations

Table 6
Characteristic Instructional Activities Selected by the Top 10% Teachers

Instructional Activities	<u>Used</u>		<u>Not Used</u>	
	%	N	%	N
Students writing workbooks/on worksheets	81.5	22	18.5	5
Listening to teacher	100.0	27	0.0	--
Constructing/experimenting/manipulating	70.4	19	29.6	8
Writing on programmed materials	70.4	19	29.6	8
Note-taking	66.7	18	33.3	9
Reading task or skill sheets	63.0	17	37.0	10
Reading assigned text materials	55.6	15	44.4	12

Note: N=Number of Observations

CONCLUSIONS

In conclusion, this study confirmed existing knowledge about teacher behaviors as a factor in student achievement. Special needs students enrolled in Pennsylvania vocational agriculture programs learned knowledge and employable skills if teachers employed suitable instructional strategies and techniques. It was concluded that successful teachers utilized adaptive instruction techniques such as (1) instruction based on student abilities, (2) students working at own pace, and (3) students receiving periodic reports of their mastery. Quantitative research has shown that adaptive instruction greatly improves student learning (Wang et al, 1985).

The successful teacher observed as part of this study carefully and consistently selected instructional strategies which proved effective for instruction of special needs students enrolled in their programs. Those strategies including asking simple questions, utilizing classroom discussions with much student input, performing demonstrations and limited use of text materials with much use of teacher-prepared materials and handouts.

RECOMMENDATIONS

An efficient means to disseminate information from this study to current Pennsylvania agriculture teachers should be developed. Specifically, inservice programs should be developed and offered for presentation and distribution to schools across the state. These programs should focus on adaptive instruction techniques found to be successful by this study and others. Specific adaptive instruction techniques recommended by this research are as follows:

1. Teachers should ask simple questions frequently during classroom discussions both of volunteers and nonvolunteers. It is recommended that appropriate questioning techniques, based on objectives for special needs students, be taught to current teachers through inservice and prospective teachers through undergraduate methodology classes.
2. Teachers should conduct demonstrations and discussions of student self-paced laboratory/classroom activities or tasks prior to students performing those activities/tasks. Use of task or skills sheets for all activities is recommended. It is also recommended that some form of hands-on, practice or skills activity be provided for each concept introduced.
3. Teachers should provide teacher-prepared materials, workbooks, and short reading assignments which reinforce concepts covered in the classroom and provide follow-up, hands-on activities. Also, handouts which encourage and teach note-taking skills are recommended.
4. Teachers should observe practice activities and provide immediate feedback, reteaching, if necessary. Task analysis with evaluation of small tasks is also recommended.
5. Teachers should use a variety of visual aids that reinforce and provide visual explanations for concepts and skills.

Particularly, teachers should have access to workshops designed to instruct them in curriculum and materials adaptation to the special needs learners. These workshops should be located in areas of the state accessible to all teachers, and offered for continuing education or college credits.

Top priority should be given by the Department of Agricultural and Extension Education, The Pennsylvania State University, and the Pennsylvania Department of Education, to the development of materials for use with special needs students, including worksheets to accompany approved practices books, ditto masters, and workbooks. A guide for use in adapting currently-owned materials should also be developed and mailed to all vocational agriculture teachers.

To insure continuation of quality special needs education in Pennsylvania vocational agriculture programs, it is recommended that information from this study be incorporated into the undergraduate curriculum in agricultural education with suitable practice activities provided. Specifically, learning modules need to be designed which would instruct prospective teachers in (1) safe, efficient classroom design, (2) preparation, selection and purchase of lesson materials for student use, (3) task analysis and evaluation, and (4) effective student monitoring during the learning process (techniques for giving feedback, making observations and, utilizing effective questioning).

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IDENTIFICATION OF TEACHING TECHNIQUES, STRATEGIES, AND
STYLES FOR USE WITH SPECIAL NEEDS STUDENTS ENROLLED IN
VOCATIONAL AGRICULTURE

A Critique

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With the current emphasis on educational excellence (as determined by testing student achievement), back to the basics, and technological literacy, it is significant that this research looked at the education of special needs students. They, perhaps more than "regular" students with whom we work, need good teachers and good teaching to learn and learn effectively. I applaud the authors for conducting this research. The purpose of this research--to determine what teaching environments, methods, and materials lead to learning by special needs students--was to be accomplished by identifying vo-ag classrooms in which the most learning was occurring and then by examining those classrooms to determine what was being done.

To determine the classrooms in which the most learning was occurring, the researchers developed a test of "general agricultural knowledge" to be administered as a pre- and post-test. An initial attempt at a pretest was aborted because of low internal consistency. Actually, a KR-20 of .65 is not really too bad, but the researchers chose to refine the instrument and administer it again as a pretest (though they labeled it "posttest 1"). Some time after administration of "posttest 1" (pretest), the posttest (called posttest-2) was administered. To give readers procedures for duplicating the study, the authors need to tell us how much instruction occurred between administrations of the tests; similarly, we need to know what the gain scores were--not simply that the "best" 10% of the gain scores were significantly different than the other 90%. The use of t-test to determine the significance of the difference in gain scores of the two groups is "self-serving": almost always, if one separates the high scores from low scores and conducts a test of difference on the groups, they will be different. With or without the t-test, one could pick the "best" teachers based on best gain scores of their students. This identifies another concern: Does a single pretest-posttest of heterogeneous students (identified as learning disabled or physically and/or emotionally handicapped) really identify situations successful with special needs students? I think not, or at least not necessarily so. In fact, if one assumed that all the teachers were identical in their ability to work with students, differences in abilities of the students themselves could lead to differentiating among class situations. In other words, I question the internal validity of this part of the study; that is, did good teaching lead to higher net gain scores? I contend that we simply cannot determine the answer to this question in the manner conducted here. Information about the student subjects is essential. Then, if in fact they were not homogeneous academically, some method of controlling these differences needed to be employed.

The second part of the study was to examine the classes of the most successful situations and to describe the environment, teaching strategies and styles, and instructional materials employed. This was most informative; but one wonders if and how these differed from the less successful teachers. Nevertheless, if we assume that the best teachers were identified and that their techniques differ from others, then we learn much from the study.

THE INDUCTION YEAR - A NATURALISTIC STUDY OF BEGINNING SECONDARY TEACHERS OF AGRICULTURE IN IDAHO

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INTRODUCTION

The ideal teacher is one who has or is working diligently toward a firm grasp of basic pedagogical skills (Griffin, 1984). Basic pedagogical skills include classroom organization, management, and discipline allowing for individual differences in learners, utilizing and selecting appropriate resources, and understanding and responding to curriculum requirements that are in place in the system, the school, and the classroom.

The expectation of the beginning teacher from the educational community is the ideal teacher. No other profession puts its beginners into a position where they are expected to immediately perform like veterans. Little has been done nor has there been any real focus on beginning teacher induction until recently. Yet, educational leaders at most levels confirm that the beginning year of teaching is critical to future success as a professional educator.

Fuller and Brown (1975) suggest three stages in the development of teachers:

1. Survival stage--The teacher concentrates on his or her personal adequacy. The foremost issues are maintaining control over the students, being liked by students, and being perceived as satisfactory by observers.
2. Teacher situation concerns--The focal point of this stage is still very much on the teacher. Emphasis is on the teacher's actions as a disseminator of knowledge and their relationship to student achievement.
3. Student satisfaction--Teachers at this stage show a concern for students and focus their attention on the perceptions of students.

Although the specific objectives of a beginning teacher program vary, the underlying purpose is to assist the beginning teacher in moving quickly through the first two stages and into the third.

PURPOSE AND OBJECTIVES

The purpose of the study was to identify patterns of behavior exhibited by beginning secondary teachers of agriculture in Idaho during the induction period, which is defined by this study as the first year of teaching.

The objectives or subproblems were:

1. Describe the characteristic behavior patterns of beginning teachers and their subjective experiences in relation to problems and issues.
2. Describe typical approaches beginning teachers use in addressing problems and issues.
3. Describe the subjective reports of beginning teacher feelings as they address problems and issues.
4. Describe the perceptions of principals relating to approaches, behavior patterns, and feelings of beginning teachers as they address problems and issues.

METHODS/PROCEDURES

The study was descriptive and qualitative in nature. Ethnographic research techniques were used for this field based naturalistic study. Hypotheses were not part of the study initially, but it was anticipated that hypotheses may have emerged as a result of the naturalistic inquiry.

DATA COLLECTION

The population included all of the eight beginning secondary teachers of agriculture in Idaho in their first year of service during the 1987-1988 academic year. The researcher utilized the role of participant observer to learn from the subjects in the culture being studied. Sources of data collected included: 1) observation field notes, 2) information from the open-ended, structured interviews with subjects, 3) information from the open-ended, structured interviews with principals, 4) information from informal discussions with faculty, students, and others who could provide relevant data, and 5) artifacts. Each of the eight subjects were visited three times beginning January and concluding in May of 1988. The length of each on-site was approximately 10 hours.

DATA ANALYSIS

Data analysis was a concurrent activity which was conducted as data were collected throughout the study. Triangulation was used to assess the sufficiency of the data according to the convergence of multiple data sources or multiple data collection procedures (Wiersma, 1986). The multiple data sources and multiple data collection procedures utilized in this study allowed for the triangulation process.

The data was reported as eight individual ethnographies.

FINDINGS

The subjects in the study ranged in age from 22 through 36. All were completing their first year of teaching. Three of the participants had made career changes and began their teaching careers at ages 27, 34, and 36. Six of the subjects were graduates of the University of Idaho. The schools in which the subjects taught ranged from small, rural, isolated schools with a student population of approximately 100, grades 9 through 12, to large schools with populations of over 700 students, grades 10 through 12. All were single teacher programs.

The problems and issues were many and varied, but typical for first year teachers. The most notable problems were: conditions of the physical facilities; classroom management and discipline problems; global organizational issues; managing the FFA component; a need for more supervision/help from the principal; curriculum scope, sequence, and pace; and problems dealing with pedagogy.

Initial behavior exhibited was generally that of being quiet and reserved, often afraid to ask for help, hesitant to act, and low self-esteem. During the first semester the subjects reported a lack of confidence and exhibited behavior characteristic of the beginning teacher survival stage. As the year progressed, subjects expressed more confidence because of the experience of the first semester. A subject reported:

At first I was scared to death and didn't know what I was doing or how to do it either. Second semester I was not scared to stand up in front of the class and teach like I was first semester. Experience proved to be a good teacher.

Initial feelings expressed by the subjects included: frustration, isolation, being afraid, disgust, anger, and confusion. These emotions resulted from inexperience in dealing with the myriad of problems which the participants incurred.

Personality was a big factor in how the teachers dealt with problems and issues. Approaches exhibited were very different probably due to the personalities involved. One subject reported:

I am a little shy and apprehensive about asking for help and trying things. It is a part of my personality.

Some hit the problems head on and in a methodical fashion:

I try to hit problems head on. I try to take care of things quickly and not let things hang on. I don't beat around the bush.

Others ignored the problems hoping that they would go away:

I avoided problems while trying to figure out my approach and often I would wait too long which sometimes made more of a problem.

Some focused most of their energy on one problem and let other things go:

I was angry as I dealt with the facility. There was trash all over the place. During the summer I worked on it until I was sick of it. It took too much of my time. I should have spread out the use of my time.

Generally the approach to problems during the second semester was more positive as a result of the first semester experiences. Organizational problems were one of the biggest problems faced by the subjects. The organizational and time management problems included everything from organization of the facility, the curriculum, and lesson planning to dealing with classroom management and discipline problems. Additionally, planning of the various FFA events took time and organization. All subjects reported problems with organization and time management. Subjects reported the following comments:

My first semester experience can be described as unorganized and one day late.

There really wasn't any organization here. The facility was a junky mess and deciding where to start with the clean-up of the facility, reorganization of the facility, and the total program was a real problem.

Time management was one area which gave me the most trouble first semester.

Subjects' teaching methods were limited and focused primarily on lecture. Subjects utilized classroom questioning; but the focus was convergent questioning and prompting and cueing students for a better or more correct answer was not evident. Clarity of lesson purpose and teaching to an objective were problems for the subjects.

Subjects appeared to be unsure as to what was expected from students in terms of behavior. Classroom control and management was often a problem. In one class students were continually reminded to stop talking. The subject threatened, ignored, and pleaded regarding student's disruptive talking. In another subject's classroom on two occasions there were several minutes at the end of the class period where students were essentially allowed to do what they wanted. They were encouraged to review their notes or prepare for their next class, but these periods at the end of class turned into noisy unproductive wasted time. Concerning the issue of discipline, six of the eight subjects indicated that they would have been much more strict from the start of school:

Discipline is still a problem I need help with. I need to know what to do in different situations. If I had it to do over I would have been much more hard-nosed from the start.

All subjects reported that little or no additional help from the principal or school district was provided during the beginning year of teaching. All the subjects' principals reported that they tried to provide closer supervision during the beginning year. Six of the eight subjects would have preferred more supervision from their principal. A subject reported:

As much as I hate to say it, I would have liked to have had more in-class observation by the principal. I wanted to know how I stood.

A principal reported:

I think he would have liked more supervision, but he will grow out of it.

CONCLUSIONS

1. As a result of inexperience in dealing with problems and issues, the behavior exhibited by beginning agriculture teachers appeared to be a lack of self-confidence.
2. Feelings of beginning agriculture teachers often focused on confusion, frustration, and isolation.
3. Approaches utilized by beginning agriculture teachers appeared to be varied due to individual personality traits.
4. Physical facilities and the management of those facilities appeared to be big problems for the beginning teachers.
5. Organizational and management issues appeared to be monumental for beginning agriculture teachers.
6. Beginning teachers generally used a limited variety of classroom teaching techniques.
7. Clearly defining daily teaching objectives and classroom expectations in terms of student behavior appeared to be problems for beginning agriculture teachers.
8. Little additional help or supervisory assistance is provided by principals to beginning agriculture teachers.
9. Beginning teachers would have preferred more in-class supervision from their principal.
10. Perceptions of principals relating to approaches, behaviors, and feelings of beginning teachers were essentially dismissed as being typical for first year teachers.

RECOMMENDATIONS

As a result of this study, teacher education in agriculture should:

1. During the undergraduate training identify personality traits and determine how to equip prospective teachers to more effectively cope with feelings and approaches in dealing with the common problems and issues they will face.
2. Refocus and reaffirm the commitment to the teaching organization and management skills.
3. Refocus and reaffirm the commitment to having teachers clearly define daily teaching objectives.

4. Refocus and reaffirm the commitment to having teachers clearly define expected student classroom behavior.
5. Continue to provide induction assistance to first and second year beginning teachers.

Questions emerging from this study which could lead to further research were:

1. Would a staff development plan which utilized divergent questioning and reflective introspection have a significant impact on:
 - A. Beginning teacher induction?
 - B. Role clarification of the principal in relation to the needs of beginning teachers?
 - C. Role clarification of the principal in relation to the needs of the total teaching staff?
2. What can be reasonably expected from a beginning secondary teacher of agriculture?

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THE INDUCTION YEAR - A NATURALISTIC STUDY OF
BEGINNING TEACHERS OF AGRICULTURE IN IDAHO

A Critique

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In reviewing this naturalistic study of the beginning teachers, I felt the choice of ethnographic research techniques, borrowed from anthropology, was an excellent one. The participant observer approach appeared to be a thorough method of gathering information about the subjects in their natural setting. The three full days devoted to observation of each teacher added to the completeness of this data gathering approach. The variety of sources of information used; the interviews with teachers, principals, students and others; the observations of student-teacher interaction; the field notes on facilities and equipment; and the artifacts all contributed to the depth of information collected about the beginning teachers and their situations. The triangulation method to assess the sufficiency of the data was a sound approach to establish the validity of this study. Additional strengths of the study included the strong theoretical and literature base cited, the clear specific objectives formulated and the concise reporting of the results and conclusions.

As with any study, questions can be raised with a view toward study improvement. First, I would ask if the literature pointed out any limitations or weaknesses in these qualitative data gathering methods. For instance, could the participant observer be a source of bias, especially if the participant observer were the researcher? What efforts were, or could be made to "assure that what occurred would have occurred with or without the presence of the researcher?" How was the extremely large mass of information summarized and analyzed in such a way to describe adequately the achievement of the objectives? Would more information about the summative interaction sessions and triangulation help us understand these approaches? How was the data, which was reported as separate individual ethnographies in the full study, analyzed and reported as grouped data in this report? Would it have been valuable for us to have seen the individual ethnographies? How many subjects are required for a strong ethnographic study? Were eight subjects enough to establish a valid picture of the induction year?

Overall, this study was extremely well done. A majority of the questions asked toward improvement were probably answered in the full expanded report of the study. The study as presented here was clearly and concisely written with all major points mentioned. However, space limitations prevented detailed explanations. The researcher is to be commended for an excellent study, using a different research technique, which added valuable information to our body of knowledge concerning beginning teachers. Particularly noteworthy was the depth and completeness of the information produced through this approach.

INSTRUCTIONAL APPROACHES USED BY EXTENSION AGENTS, ADULT INSTRUCTORS, AND SECONDARY TEACHERS TO TEACH FARMERS

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Adult education in agriculture is not a new phenomenon. As early as 1607, American Indians were teaching colonists how to produce crops (Anderson, 1982). In 1785 the Philadelphia Society for Promoting Agriculture was formed to increase agricultural production and in 1860 there were over 940 versions of the society (Phipps & Osborne, 1989). In 1826, adult education in agriculture was being delivered through the "lyceum movement." Over 900 municipalities held town meetings (lyceum) in 1831 to discuss agricultural topics (True, 1929). In 1870, a form of publicly controlled adult education was evolving from what were known as "farmer institutes" (Phipps & Osborne, 1989, p. 475).

Many of today's public sector programs can be traced to the Smith-Lever and Smith-Hughes Acts enacted in 1914 and 1917, respectively, that created the Cooperative Extension System and provided federal funds for vocational-technical education in agriculture. Adult programs emanating from the two Acts grew steadily until the late 1970s. However, during the 1980s competition between secondary and adult programs for resources resulted in fewer adult programs being offered by agriculture teachers (Phipps & Osborne, 1989, p. 475). In addition, the number of vocational agriculture teachers available to conduct adult education declined from 12,510 in 1980 to 11,042 in 1986 (Craig, 1988, p. 11).

RELATED RESEARCH

The number of vocational agriculture teachers declined even though school administrators support the concept of public schools delivering adult instruction in agriculture (Adelaine & Foster, 1989; Miller & Krill, 1985). Administrators of school systems with adult programs are more supportive than superintendents, principals, and vocational agriculture teachers without such programs (Adelaine & Foster, 1989). In addition, Adelaine and Foster (1989) found that 34% of the superintendents, principals, and vocational agriculture teachers preferred that local school systems have most responsibility for adult agricultural education (23% preferred extension and 20% community colleges).

In terms of subject matter, agricultural educators have identified farm business management as their number one adult education priority (Burhoe & Stewart, 1983). Martin and Omer (1988) confirmed that Iowa young farmers have educational priorities similar to those of agricultural educators included in the Burhoe and Stewart study. Further, adult program participants tend to be satisfied with the instruction. Martin and Omer (1988) found that 80% of Iowa young farmers had attended extension meetings and over 70% were satisfied or very satisfied with the information and services received. Habeeb, Birkenholz, and Weston (1987) concluded that Missouri Extension Council officers and farmers who used the Extension Service were satisfied with the information, specialists, methods, and the agricultural extension education program. When Ohio farmers ranked 12 agencies according to the importance they place on and their confidence in educational programs they conduct, extension ranked first and vocational agriculture teachers 7th in both

importance and confidence (Kramic, 1987). Kramic also found that when these farmers make production and marketing decisions, county extension agents are exceeded only by other farmers and family members as important resource persons.

From an instructional delivery perspective, the farmers included in the Kramic (1987) study ranked extension bulletins and newsletters first for (1) having the most accurate contents and (2) because of their confidence in these types of publications. In a related study, Richardson (1989) found that North Carolina farmers use newsletters, meetings, farm visits, telephone calls, and on-farm tests more often than 16 other techniques commonly used by extension agents. Richardson also found that these farmers plan to use the same techniques in the future. "For 23 of the 29 media choices, the percentage of producers projecting future use showed less than a 5% increase or decrease" (Richardson, 1989, p. 25-26). Use of computers was the notable exception to this trend. Richardson found that this technique moved from a current use ranking of 19th to a future use ranking of 8th. In addition, Richardson (1989) found no significant difference between full and part-time farmers on which techniques were important to them and their current use of those techniques.

PURPOSE AND OBJECTIVES

Adult programs conducted by extension agents and agriculture teachers were created to serve different purposes. Extension agents typically use nonformal approaches and agriculture teachers formal methods to deliver instruction to farmers. However, few researchers have examined the extent to which instruction is being delivered in a manner consistent with the intent of the early 1900s legislation. How do the two systems compare in terms of content being delivered and instructional techniques commonly used? Few answers are available in the literature. Thus, the problem examined in this study focused on two questions:

1. What subject matter areas are being delivered to farmers by agricultural extension agents, full-time adult teachers, and secondary vocational agriculture instructors?
2. What types of instructional approaches do agricultural extension agents, full-time adult teachers, and secondary vocational agriculture instructors use most often when they teach farmers?

The three objectives of the study were to:

1. Describe the types of farmers who participate in instruction delivered by agricultural extension agents, full-time adult teachers, and secondary vocational agriculture instructors.
2. Compare the types of instruction being delivered to farmers by agricultural extension agents, full-time adult teachers, and secondary vocational agriculture instructors.
3. Compare the instructional approaches that agricultural extension agents, full-time adult teachers, and secondary vocational agriculture instructors use most often when they deliver instruction to farmers.

PROCEDURES

Three groups of agricultural educators who conducted adult agricultural education programs in Ohio during the 1987-88 school year comprised the target population. This population consisted of 71 agricultural agents employed by the Ohio Cooperative Extension Service (OCES), 33 full-time adult Farm Business Planning and Analysis (FBPA) teachers, and 101 secondary vocational agriculture instructors. The frame was provided by the OCES personnel director and the district supervisor responsible for adult education in the Agricultural Education Service of the Ohio Department of Education. A stratified random sample of 134 subjects was drawn to provide a 95% level of confidence and a 5% sampling error (Krejcie & Morgan, 1970). The sample included 46 OCES agents, 22 FBPA teachers, and 66 secondary instructors.

The researchers developed a questionnaire to collect data for the study. Four agricultural education faculty at The Ohio State University and a state supervisor of agricultural education validated the content of the instrument. The questionnaire was pilot tested with a random sample of 30 subjects not chosen for the sample. Five subscales measuring the importance of subject matter being taught had acceptable reliability (Cronbach's $\alpha = .83 - .95$). The questionnaire was mailed to the sample on May 20, 1988. After four weeks, 104 subjects had responded (77%). Respondents who returned the questionnaire the first two weeks were compared with those responding the last two weeks. No significant differences were observed ($p > .05$) in years of adult education experience, years in present position, age, type of farming in the community, highest degree earned, and whether a full or part-time adult educator.

The data were analyzed using descriptive statistics and two nonparametric statistical procedures, the Spearman rho technique and the coefficient of concordance. These procedures were chosen to determine the extent of agreement among two or more groups.

RESULTS

Slightly over 40% of the OCES agents, 47% of the FBPA teachers, and 43% of the secondary instructors were in the 36-45 age category. All but one agent, slightly over half of the FBPA teachers, and two-thirds of the secondary instructors held at least a master's degree. Eighty percent of the FBPA teachers, 56% of the agents, and 44% of the secondary instructors had been in their present positions fewer than 10 years. However, in terms of years as an adult educator, 85% of the agents, 66% of the FBPA teachers, and 62% of the secondary instructors had 10 or more years of experience. Slightly over 97% of the agents, 87% of the FBPA teachers, and only 4% of the secondary instructors considered themselves full-time adult educators.

The adult educators were asked to describe the farmers who participated in their adult programs. They classified the farmers using the following Bureau of the Census (1983) criteria: Part-time farmers were employed and worked off the farm 100 or more days during the year; full-time farmers worked off the farm fewer than 100 days. FBPA teachers tended to enroll full-time farmers in their instructional programs (71% full-time); OCES agents and secondary instructors part-time farmers (56%). Almost half (49%) of the participants in adult farmer programs conducted by secondary instructors were under age 35, 28% were 35-45, and 23% were over 46 or older. OCES agents reported that 20% of their participants were under age 35, 26% were 35-45, and 54% were 46 or older. For FBPA teachers, 21% of their participants were under age 35, 41% were 35-45, and 38% were 46 or older.

Another Bureau of the Census (1983) standard for categorizing farms was used to determine which farm sizes predominated in areas served by OCES agents, FBPA teachers, and secondary instructors. Using this standard, a small scale farm has annual gross sales under \$100,000, medium scale between \$100,000 - \$250,000, and large scale over \$250,000. In 1985, the average Ohio farm was small scale because the mean gross farm income was \$50,416 (Ohio Agricultural Statistics Service, 1986, p. 59). As shown in Table 1, OCES agents delivered instruction in areas where small and medium size farms predominated. FBPA teachers taught in areas where medium scale farms were most common. Secondary instructors tended to deliver instruction to farmers in areas where medium and to a lesser extent small scale farms were most common.

Table 1

Predominant Farm Sizes in Geographic Areas Served by OCES Agricultural Agents, Full-time Adult Teachers, and Secondary Vocational Agriculture Instructors.

Predominant Farm Size	OCES (n=38)		FBPA (n=15)		Vo-Ag (n=49)		All Groups (n=102)	
	f	%	f	%	f	%	f	%
Small	18	47.4	2	13.3	12	24.5	32	31.4
Medium	18	47.4	12	80.0	30	61.2	60	58.8
Large	2	5.2	1	6.7	7	14.3	10	9.8
Total	38	100.0	15	100.0	49	100.0	102	100.0

The three groups of adult educators were asked to rank five subject matter areas according to how important it was for them to deliver instruction in those areas for farmers. As shown in Table 2, crop and livestock production were the two most important areas; horticulture and agricultural mechanics least important. The three groups were in very high agreement on the importance of the topics ($W=.97$).

Table 2

Means, Standard Deviations, and Rankings for Subject Matter Areas That OCES Agricultural Agents, Full-time Adult Teachers, and Secondary Vocational Agriculture Instructors Perceived Most Important for Them to Deliver to Farmers.*

Subject Matter Area	OCES (f=39)			FBPA (f=15)			Vo-Ag (f=50)		
	M	SD	Rank	M	SD	Rank	M	SD	Rank
Crop Production	4.0	.5	1	3.6	.7	1	3.8	.6	1
Livestock Production	3.9	.5	2	3.5	.8	2	3.7	.8	2
General Agriculture	3.4	.4	3	3.5	.5	2	3.3	.6	3
Horticulture	2.8	.8	4	1.7	.6	5	2.1	.8	5
Agricultural Mechanics	2.5	.7	5	2.6	1.2	4	2.9	.7	4

* - Means based on scale of 1 = not important to 5 = extremely important. $W=.97$, $df=4$, $p<.05$

As shown in Table 3, the OCES agents and FBPA teachers spent most of their contact hours during 1987-88 delivering instruction about livestock production and general agriculture (i.e. farm business management, human relations, natural resources, computers, environmental management, and related topics). Crop production and general agriculture were the two areas in which secondary instructors devoted the most contact hours. Crop production was also the area in which agents devoted the least contact hours. Both FBPA teachers and secondary instructors devoted the least hours to horticultural topics.

Also shown in Table 3 is that the secondary instructors devoted fewer hours to adult farmer instruction (mean of 15 hours per instructional area) than either the agents (mean of 114 hours) or the FBPA teachers (mean of 79 hours). In addition, based upon contact hours devoted to each area, the three groups did not agree on the rank order for the subject matter areas ($W=.44$, $p>.05$). Further, when each group's importance ranking for the subject matter areas (see Table 2) was correlated with that group's contact hour ranking for the same areas (see Table 3), the two rankings did not agree for any of the groups ($p>.05$ for the 3 r_s coefficients). Thus, during 1987-88 all three groups delivered subject matter in areas other than those which they perceived to be most important.

Table 3

Mean Contact Hours of Adult Farmer Instruction Delivered in Five Subject Matter Areas During 1987-88 by OCES Agricultural Agents, FBPA Teachers, and Secondary Vocational Agriculture Instructors.

Subject Matter Area	OCES (f=39)			FBPA (f=15)			Vo-Ag (f=50)		
	M	SD	Rank	M	SD	Rank	M	SD	Rank
General Agriculture	206.7	133.7	1	117.2	140.6	2	21.1	23.6	2
Livestock Production	186.4	186.6	2	137.0	143.0	1	14.8	18.0	4
Horticulture	96.0	124.1	3	8.6	17.5	5	4.2	9.1	5
Agricultural Mechan.	56.2	51.4	4	25.7	33.1	4	15.9	23.2	3
Crop Production	27.5	41.7	5	107.6	127.8	3	21.7	21.2	1
Mean Hours:	114.6	70.7	-	79.2	51.8	-	15.5	6.3	-

($W=.44$, $df=4$, $p>.05$)

The three groups of adult educators were asked to rank 14 approaches commonly used to deliver instruction to farmers. As shown in Table 4, OCES agents used office calls, telephone calls, bulletins, and newsletters most often. FBPA teachers indicated that they used on-site individualized instruction, on-farm demonstrations, telephone calls, and classroom instruction most often. Approaches that secondary instructors used most often were resource persons, classroom instruction, on-site individualized instruction, and newsletters. Teleconferencing and mass media (radio, television, and magazines) were used least by all three groups. The three groups were in high agreement ($W=.71$) on how often they used the 14 approaches.

Table 4

Means, Standard Deviations, and Rankings of 14 Instructional Delivery Approaches Used by OCES Agricultural Agents, FBPA Teachers, and Secondary Vocational Agriculture Instructors.*

Instructional Delivery Approach	OCES (f=33)			FBPA (f=14)			Vo-Ag (f=40)		
	M	SD	Rank	M	SD	Rank	M	SD	Rank
Office calls	3.5	.5	1	2.5	.8	7	2.4	.8	6
Telephone calls	3.5	.5	1	3.2	.7	3	2.4	.9	6
Bulletins	3.4	.5	3	2.2	.6	7	2.6	.7	5
Newsletters	3.3	.6	4	2.7	.9	5	2.7	.9	4
Newspapers	3.1	.7	5	2.2	.7	7	2.2	.8	10
On-farm demos.	3.0	.7	6	3.3	.8	2	2.4	.8	6
On-site indiv. inst.	3.0	.6	6	3.9	.2	1	2.9	.8	3
Resource persons	3.0	.7	6	2.6	.4	6	3.4	.6	1
Workshops	3.0	.6	6	2.2	.7	7	2.3	.9	9
Classroom sessions	2.9	.5	10	2.8	.6	4	3.4	.8	1
Radio	2.7	.9	11	1.6	.6	12	1.9	.8	12
Magazines	2.0	.6	12	2.0	.7	11	2.0	.8	11
Television	2.0	.9	12	1.1	.3	13	1.2	.4	13
Teleconferencing	1.5	.8	14	1.0	.0	14	1.2	.4	13

* - Means based on scale of 1 = never used to 4 = usually used.
(W=.71, df=13, p<.05)

DISCUSSION

The secondary instructors accurately described themselves as part-time adult educators based on the mean contact hours of instruction they delivered to Ohio farmers. When compared with OCES agents and FBPA teachers, it is apparent that farmers were not the primary audience for the secondary instructors. The in-school program is the most likely reason why farmers were not the primary audience for secondary instructors. The data also suggest that the FBPA teachers and OCES agents were more alike than different in terms of the instruction they delivered for farmers.

From a subject matter standpoint, the groups agreed on the important topics that they should deliver for farmers. However, the subject matter areas delivered during 1987-88 were not what they deemed most important. The instruction the groups delivered tended to match the Burhoe and Stewart (1983) findings about crop and livestock instruction ranking between farm management and agricultural mechanics in importance.

The data also indicate that the three groups of educators agreed on the approaches they used to deliver instruction to farmers. However, even though the three groups agreed on the ranking for the approaches, there were differences in how often they used them. Both agents and FBPA teachers tended to use individualized, nonformal approaches while secondary instructors used classroom sessions and resource persons. The agents also used the most approaches, i.e. individualized approaches, printed materials, and nonformal, group approaches. This finding tends to match the instructional preferences of North Carolina (Richardson, 1989) and Iowa farmers (Martin & Omer, 1988). A notable departure from this finding was that Iowa young farmers wanted Extension agents to use group approaches more than office and telephone conferences (Martin & Omer, 1988).

Even though OCES agents used radio and television more than either the FBPA teachers or the secondary instructors, they do not appear to be using the broadcast media to the extent desired by farmers. The data indicate that OCES agents included in this study ranked radio and television lower in importance than did either Iowa young farmers (Martin & Omer, 1988) or North Carolina farmers (Richardson, 1989).

RECOMMENDATIONS

The following recommendations are made based on the findings of the study.

1. Extension educators and staff development officers should incorporate the findings of this study when designing and conducting inservice activities for personnel who deliver educational programming for farmers.
2. Faculty who instruct teaching methods and communications courses should use the findings of this study when designing experiences for students who will deliver adult farmer instruction.
3. Additional research is needed to determine how mass media might be used more extensively by agricultural educators to deliver instruction to farmers.

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Instructional Approaches used by Extension Agents, Adult Instructors, and Secondary Teachers to Teach Farmers

A Critique

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General: The authors of this study of adult education in agriculture do a nice job of piecing together a very brief historical review of the origin of adult education. Their historical review is then augmented by a brief review of some of the adult education research conducted in the decade of the 80's. They have chosen an arena in which to study where there are a number of significant issues to address. Their choice of a comparative analysis of programs conducted by Extension, farm business management instructors and secondary teachers can add significantly to an understanding of differentiated roles and appropriate instructional technology.

The study: While there might be numerous techniques to answer the three implied research questions, the authors selected a procedure most would judge to be adequate. The sampling technique designed to provide a 95% level of confidence in the response, the procedures for developing instrumentation, the data collection/analysis procedures and accounting for non-respondents are all adequate.

The authors appropriately selected simple tables to present the data and used the narrative only to describe the most obvious and significant comparisons among these groups and their respondents. In the discussion section they did not stray from their data and used the opportunity to illustrate how their findings were similar to or different from other research reported in the literature.

What should we remember about this study? Two fairly important findings should be tucked away in our memory, especially if we are from or have programs very similar to those in Ohio.

1. Extension agents and FBMA teachers are more similar in their program of instruction and delivery techniques than they are different. If this is in fact true, policy makers might well ask why there should be two agencies working with the same client group, both supported by public funds. Are they really similar or does the research design only make them appear to be similar.
2. What we say and what we do may be two different things. In this study Extension agents, FBPA teachers and high school teachers placed a different emphasis on their teaching and program delivery than they did on the importance of the five areas of instruction.

How could this study be improved? The authors may wish to examine three specific portions of this study to see if there are ways it could be improved.

Title: The title does not describe the study - in fact, it focuses on only one of several aspects of the study. A more descriptive title would be informative to potential readers.

The subject matter areas: The literature suggests a different set. The five areas reported in this study are too broad and encompassing to be instructive. For example, the subject area of farm business management, described in the literature as the number one adult education priority was subsumed under a broad heading of "General Agriculture". It may well be the attention paid to the subheading content areas that differentiates among the kinds of programs delivered by the three groups. Gross aggregation loses important details.

Recommendations: The recommendations are too general to be of any value. A re-look at the results of the study and attention to some of the details hidden by aggregation might generate recommendations that will modify education practice.

THE INTERACTION OF SECONDARY AGRICULTURE TEACHER HEALTH AND THE SCHOOL AS A WORKPLACE

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INTRODUCTION

Teacher health is described as the physical and mental well-being of teachers (Harlin, Jerrick & Rosenthal, 1976). Harlin et al. (1976) describe ten categories of health concern that may create barriers to good teaching. The categories are: (a) emotional or psychosomatic, (b) communicable diseases, (c) systemic, (d) vision and hearing problems, (e) dental disorders, (f) surgery, (g) injuries, (h) orthopedic problems, (i) weight and nutritional problems, and (j) pregnancy or child care.

Factors in a workplace affect employee health. Standards developed under the Occupational Safety and Health Act (OSHA) have placed a high priority on working conditions in a variety of employment situations (Godbey, 1979). What about the school as a workplace? What environmental conditions affect the physical and mental health of teachers? More importantly, are appropriate programs or policies in place to deal with the interaction of teachers and the school as a workplace?

"Schools have for a long time imposed upon teachers a set of working conditions that can only be described as demoralizing and debilitating" (Levine, 1986, p. 161). Results of a study conducted by Instructor magazine verified the dismal picture printed by Levine. Landsmann (1978), editor-in-chief of Instructor magazine, reported that one-third of the teacher respondents felt that the environment of the school negatively affected their health. A subtabulation showed that the 39 percent of the teachers responding yes to the question, "Does your principal take an active role in helping teachers stay mentally and physically healthy?" enjoy demonstrably better health than the 61% responding no. Plowman and Bischoff (1985) point out that even though wellness programs are commonplace in business and industry, few are found in elementary and secondary schools.

Substantiation of the presence or lack of suitable workplace conditions for agriculture teachers is long overdue. As Harper, Weiser, and Armstrong (1989, p. 214) stated, "Teachers of Vocational Agriculture teach in what may be perceived as a unique environment when compared to other teachers in a secondary school. Vocational agriculture teachers instruct not only in classrooms and laboratories, but also on-site at their student's farms and ranches." Teachers and students alike will gain from scientific information on the interaction of teacher health and the school as a workplace.

PURPOSE AND OBJECTIVES

The purpose of this research was to identify the factors in the school workplace that may contribute to health status of secondary agriculture teachers in the United States. The following objectives contributed to achieving the purpose: (a) to determine the scope and relationship of

wellness programs to secondary agriculture teachers in the United States; (b) to determine the relationships, and perceptions of agriculture teachers to school environment and teacher health; (c) to determine the relationships, and perceptions of secondary agriculture teachers, regarding administrator assistance in maintaining teacher health and health care experiences; and (d) to describe health factors related to the school workplace.

PROCEDURE

The research involved a descriptive-correlational study. A systematic sample of 502 vocational agriculture teachers was selected from the 12,053 names listed in the 1987 edition of the Agriculture Teachers Directory. A random entry point was established with the name of every 24th teacher appearing in the Directory being selected. The sample size was based on Krejcie and Morgan (1970) and previous experiences with the population (Handley, 1988). They suggested that a minimum data sample of 300 was considered adequate.

The Educator Health Care Assessment Instrument (EHCAI) (Copyright 1988, Mississippi State University) was designed following the guidelines of Sudman and Bradburn (1982). Considerable literature on health care was reviewed to establish general content parameters for the instrument. The EHCAI was designed with two major parts: Part One included health care experience and concerns and Part Two included a number of health related factors.

Part One was organized around nine areas, as follows: injuries, surgery, dental conditions, emotional or psychosomatic conditions, pregnancy/child care, communicable diseases, orthopedic conditions, systemic conditions, and vision/hearing conditions. Each of the nine areas contained two or more specific health care items to which the respondents were to provide information to three questions: (a) "Have you experienced this health care item?" (Respondents circled "yes" or "no.") (b) "How many days did you miss from school/work because of the health care item in the past year?" (Respondents listed the actual number of days.), and (c) "How much concern is the health care item to educators?" (Respondents used a five-point scale to rate the level of concern, with five being the highest concern and one being the lowest concern.)

Part Two, health related factors, included a number of items present in the school and personal environment that might be related to health care experiences and concerns of educators. Particular emphasis was placed on assessing the school-site environment as related to the health of educators.

A panel of 10 health care and education experts validated the instrument. A stratified sample of 39 (26 responded) vocational agriculture teachers representing the four FFA regions of the United States was used to establish reliability. Cronbach alpha coefficients of .85 were found on the pilot study and .97 on the data sample.

A modification of the Total Design Method (Dillman, 1978) was used in gathering information from the sample. This included mailing a personalized memorandum and the EHCAI on April 15, 1988, followed 5 days later by a reminder card. Planned second and third mailings were not made because of the excellent response rate, lateness in the school year, and possible returns

relative to dollar cost. A data sample of 303 was obtained from an accepting sample of 306. Ten percent of the nonrespondents were systematically selected using a random entry point for contact by telephone to obtain information to compare responses of nonrespondents to respondents. No substantial differences were found.

Data analysis for the research involved the calculation of central tendencies, relationships, and significance tests.

RESULTS

It was the perception of 42% of the respondents that school environment affected the health of educators. The ten areas perceived as being the greatest environmental problems were (in descending order): laboratory noise level (25% of the data sample), laboratory air quality (23%), laboratory temperature (17%), laboratory instructional chemicals (14%), classroom temperature (14%), laboratory acoustics (12%), laboratory cleanliness (11%), laboratory safety features (11%), laboratory lighting (10%), and classroom air quality (10%).

The health of 128 teachers (42%) who stated that the school environment affected the health of educators was compared to the 161 (53%) who did not. Significant and meaningful relationships existed. The differences (by individual health item) indicate that agriculture teachers who perceive the school environment to affect the health of educators experience more laboratory injuries, more abuse/violence from students, undergo more minor surgery, greater job stress, more depression, increased insomnia, greater fatigue, and greater hearing loss.

Insert Table 1 about here

The differences (by health category) indicate that agriculture teachers who perceive the school environment to affect the health of educators miss more days of school due to injuries and communicable diseases.

Insert Table 2 about here

Agriculture teachers were asked the question, "To what extent does your immediate administrator assist you in maintaining physical and mental well-being"? A five-point Likert Scale with polar descriptors (1 = none, 5 = much) was used. Thirty percent of agriculture teachers responded (1) none; an additional 19% marked (2). Fifteen percent of teachers marked (4); only 7% responded (5) much.

A comparison was made of teachers who perceived their immediate administrator as assisting in maintaining physical and mental well-being to those who did not. Teachers who perceived a lack of administrative assistance experienced greater abuse/violence from students, more frequent headaches, and more digestive problems.

Insert Table 3 about here

Agriculture teachers offered suggestions regarding ways administrators could better assist teachers. The most common responses included positive feedback, willingness to communicate, and better management of the school environment and facility.

Wellness programs exist in 20% of the schools in this study. In the schools where wellness programs exist, only three out of every five agriculture teachers participated. A comparison of the health of teachers who participated in a wellness program (n=43) to those who did not (n=260) was made. The differences (by health category) indicate that wellness program participants miss significantly fewer days of school due to injuries and systemic problems. Differences (by individual health item) indicate that wellness program participants were more apt to use alcohol and missed more days of school due to alcohol use. Though an unusual finding, one must interpret it cautiously. Since wellness program participants were not randomly selected, several plausible explanations exist (i.e. location of wellness programs, participation under direction of a chemical dependency counselor and personality differences) for greater alcohol use.

Insert Table 4 about here

A number of additional factors may be indirectly related to the school workplace. Fifty-six percent of all respondents were overweight, with 35% being more than 10 pounds overweight. A relationship was found between overweight teachers and increased colds and circulatory problems. Irregular meals were a problem for 28% of the respondents; 17% felt they received improper nutrition. Twenty-seven percent indicated that they smoked, dipped, or chewed tobacco. A relationship was found between tobacco users and increased usage of alcohol.

CONCLUSION AND/OR RECOMMENDATIONS

The findings of this study supported some of the literature reviewed. Teachers perceived the school workplace to be deficient in (a) physical environment, such as laboratory noise and air quality, and (b) administrative assistance in maintaining physical and mental well-being. The data verified that only a small percentage (20%) of schools had wellness programs.

Significant and meaningful relationships existed between: (a) environment and health care experiences, (b) environment and days missed by health area, (c) administrative assistance and health care experiences, and (d) wellness program participation and days missed by health area. The most important relationships were in the health categories of injuries, systemic, and emotional or psychosomatic. Development of a valid wellness program for educators is recommended. This recommendation is based on the direction of relationships aforementioned and the theoretical underpinning of the

capability of wellness programs to improve psychosomatic health and reduce systemic disorders. A similar study should be carried out with vocational teachers in other areas and non-vocational teachers. The findings could be used in designing a wellness program for vocational schools and educators.

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Table 1

Relationship Between Health Experiences and School Environment of Teachers

Health Item	Phi Coefficient*
Fatigue	.23
Laboratory Injuries	.21
Insomnia	.18
Hearing Loss	.17
Student Abuse/Violence	.17
Depression	.16
Job Stress	.15
Minor Surgery	.15

* $p \leq .05$

Table 3

Relationships Between Health Experiences and Lack of Administrator Assistance As Perceived By Agriculture Teachers

Health Item	Cramers' v*
Digestive Problems	.22
Headaches	.21
Student Abuse/Violence	.19

* $p \leq .05$

Table 2

Relationship Between Days Missed (By Health Categories) and School Environment of Agriculture Teachers

Variable	Group ^a	n	M	SD	t	p
Injuries	1	159	.0016	.020	-2.52	.013*
	2	127	.1102	.487		
Surgery	1	159	.1237	.678	- .29	.771
	2	127	.1470	.664		
Dental	1	159	.0608	.333	- .35	.723
	2	127	.0735	.272		
Emotional or Psychosomatic	1	159	.0480	.191	- .83	.405
	2	127	.0651	.157		
Communicable Diseases	1	159	.1472	.273	-2.22	.027*
	2	127	.2220	.295		
Orthopedic	1	159	.0021	.026	-1.70	.092
	2	127	.0184	.105		
Systems	1	159	.0830	.490	- .45	.656
	2	127	.1197	.817		
Pregnancy/ Child Care	1	159	.0833	.455	- .73	.469
	2	127	.1358	.706		
Vision/ Hearing	1	159	.0084	.064	- .26	.794
	2	127	.0105	.072		

* $p \leq .05$

a1 = No problem

a2 = Yes, problems exist

Note. Adjustments have been made for variables that violated the homogeneity of variance assumption.

Table 4

Relationship Between Days Missed (By Health Categories) and Agricultural Teacher Participation in School Wellness Programs

Variable	Group ^a	<u>n</u>	<u>M</u>	<u>SD</u>	<u>t</u>	<u>p</u>
Injuries	1	264	.0530	.341	2.08	.038*
	2	36	.0069	.042		
Surgery	1	264	.1351	.683	.79	.434
	2	36	.0741	.391		
Dental	1	264	.0694	.318	1.67	.098
	2	36	.0278	.093		
Emotional or Psychosomatic	1	264	.0499	.144	- .54	.594
	2	36	.0783	.312		
Communicable Diseases	1	264	.1765	.293	.96	.342
	2	36	.1444	.170		
Orthopedic	1	264	.0088	.074	- .04	.968
	2	36	.0093	.056		
Systems	1	264	.1053	.681	1.98	.049*
	2	36	.0194	.067		
Pregnancy/ Child Care	1	264	.0881	.514	- .86	.394
	2	36	.2153	.864		
Vision/ Hearing	1	264	.0101	.070	.86	.391
	2	36	.0000	.00		

* $p \leq .05$

a1 = No problem

a2 = Yes, problems exist

Note. Adjustments have been made for variables that violated the homogeneity of variance assumption.

THE INTERACTION OF SECONDARY AGRICULTURE TEACHER HEALTH AND THE SCHOOL AS A WORKPLACE

A Critique

Randol G. Waters, University of Tennessee--Discussant

Physical well being and performance in the workplace are two variables which deserve considerable attention in our profession. Over the years, numerous studies have concluded that agricultural teachers are subject to professional "burnout". Burnout appears to be related to job stress, fatigue, student abuse, and other "negative" job-related characteristics. I found it intriguing that 20 percent of the schools identified for this study provide "wellness" programs for their employees. Further study of the success of these programs should prove to be even more informative.

Overall, this paper was quite well written. It is typical of a paper which is based upon a well designed *ex post facto* study. Although somewhat abbreviated, the review of literature was adequate to understand the theoretical basis for the study. The purpose of the study was clearly stated. The enabling objectives were stated in a manner which was understandable. However, I would suggest some minor editorial changes which may make them a bit easier to interpret. Supporting tables and statistics were appropriate and they were in agreement, generally, with the written text of the paper. The researchers were cautious in their conclusions and recommendations. They clearly understand the limitations of pre-experimental designs for research.

Following are a few specific observations and suggestions which the authors may wish to consider as they continue their research.

- Although reliability of instrumentation is important to all survey research, it would be much more appropriate to report a coefficient of repeatability for the questionnaire used in this study than a coefficient of internal consistency. There appears to be no logic in assuming that responses to individual items should be related.
- The authors' assumption that they had an "excellent" response rate at the end of the first mailing was a bit "over stated". A sixty percent return is indeed good for only one mailing and a postcard follow-up. However, I do not think it was adequate to justify the suspending of their previously identified follow-up procedure. The authors did compare these responses to those from a phone survey of a 10 percent sample of non-respondents. However, supporting statistical data would have enhanced their statement that "no substantial differences were found".
- There were at least two instances in the discussion of their results where distributions did not sum to 100 percent. I assume this means that there was considerable non-response to some of the questions (as high as 29 percent in one case). If this was indeed true, it should have been noted as a limitation of the study. If sample size permits, it is often better to simply drop incomplete surveys from the study prior to analysis of data. Conclusions based upon "roving n's" are sometimes misleading. In reality, the reported 303 usable responses appears to be considerably lower for a number of questions.

In conclusion, this study offers considerable information to those wishing to further explore the relationship between teacher health and the workplace. As more schools begin to offer wellness programs to their employees, the opportunity to explore the impact of such programs on teacher health will be most interesting.

LEADERSHIP ABILITY OF YOUNG RURAL ADULTS IN NORTH DAKOTA

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INTRODUCTION

Leadership has been defined as "the means by which one or more persons aid a group in setting and attaining desirable goals" (Kreitlow et al., 1965, p. 57). Wills (1974) defined a leader as a person who has the ability to get others to act in a certain and definite way. Contrary to popular opinion, leadership characteristics are not inherited; they are developed over a period of time.

In 1976, the National Advisory Council on Women's Educational Programs conducted a major investigation to determine the educational needs of rural women and girls in the United States. The investigation involved a series of four consultations by the Council in different locations around the country which gave rural women and girls a chance to speak out on their educational needs and concerns. Clarenbach (1977) reported the investigations suggested a need for expanded programs that developed processes for the identification of leadership and then helped with the translation of leadership experience and skills into political and public policy leadership.

Williams and Faulkner (1979) evaluated the impact on participants of the Kellogg Extension Education Project conducted in Montana. The Kellogg Extension Education Project was funded from the W. K. Kellogg Foundation for the purpose of increasing leadership skills of present and future leaders in Montana. Activities of the program ranged in intensity from a one-week training program to a study travel program of roughly four weeks' duration per year for a period of three years. The results reported indicate that participation in the Kellogg Extension Education Program positively affected participants' perceptions of their leadership abilities. A total of 81.9% of all participants reported that the program had made a difference in their lives. The data also suggested that participation in the program had a measurable impact on participants' exercise of leadership in public affairs activities.

Numerous studies have been conducted to evaluate the results of leadership development programs. However, few have been conducted which evaluate the leadership qualities of individuals prior to formal leadership development activities. One problem facing rural communities is that the pool of individuals who are able to provide effective leadership is considerably smaller in number than in urban areas. An understanding of the characteristics, leadership qualities, and leadership development needs of young adults in rural North Dakota will be useful in determining the need for leadership development programs in the state.

PURPOSE AND OBJECTIVES

The purpose of this study was to assess the perceived leadership abilities of young adults residing in rural areas of North Dakota. Specific objectives of

this study were: 1) to identify selected biographical characteristics of young adults residing in rural areas of North Dakota such as age, sex, level of education, marital status, and size of family; 2) to determine the perceived leadership ability of young rural adults in North Dakota; and 3) to compare results of the perceived leadership ability of young rural adults using selected biographical characteristics as variables.

PROCEDURES

The target population for this study was young adults residing in rural North Dakota. For the purpose of this study, the researcher determined that young adults were considered to be those persons between the ages of 18 and 40. Rural areas were considered to be cities with a population of fewer than 2,500 and those areas outside of towns and cities. A sample size of 1,500 was desired for this study. This number far exceeded the necessary sample size according to Krejcie and Morgan (1970).

Because the record of licensed drivers represents the most complete list of persons between the ages of 18 and 40 in the state, permission was sought and granted by the Drivers License Division of the North Dakota Highway Department to obtain the sample from their list of licensed drivers. A systematic random sampling procedure was used to draw the sample names with addresses whose birthdays fell between January 1, 1944, and January 1, 1966; and whose addresses contained a zip code matching those of rural areas.

Data for this study were collected by use of a mail survey questionnaire. The questionnaire was developed by the researcher using related literature and previous research as a basis. Assistance was obtained from a panel of experts including an extension sociologist, former teachers of vocational agriculture, and agricultural education staff. Part I of the questionnaire asked respondents to provide background information. Part II consisted of 70 statements reflecting leadership characteristics. Respondents were asked to indicate their perceived leadership by indicating their level of agreement most descriptive of their feeling toward the statement. Available responses were on a Likert-type scale as follows: 1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = slightly agree; 5 = moderately agree; and 6 = strongly agree.

The instrument was reviewed by the panel of experts, and revisions were made according to their suggestions. It was then pilot tested for content validity using undergraduate and graduate students as the test group. The questionnaire along with a cover letter and self-addressed, stamped envelope was sent in October of 1984 to each person in the sample. Non-respondents were followed up with a second questionnaire package.

Totally, 578 usable questionnaires were returned resulting in a 38.3% response rate. As the questionnaires were returned, they were categorized as either early or late respondents. An analysis of the responses to Part II using analysis of variance (ANOVA) revealed no significant differences between the mean scores of early and late respondents. If non-respondents are most likely to respond as late respondents do, one can then conclude the non-respondent group was similar to respondents.

ANALYSIS OF DATA

Data were entered and stored in the computer for analysis purposes. Frequencies and percentages were used to report results regarding the biographical characteristics of respondents. To determine the perceived leadership ability of respondents, data were analyzed using frequencies, mean scores, and standard deviations. Inferential statistics were used to analyze the data when making comparisons of the perceived leadership ability using selected biographical characteristics as the basis for comparison. The t-test program of the Statistical Analysis System (SAS) was used when comparing two groups. Analysis of variance (ANOVA) was used when making comparisons among more than two groups. If significant differences did occur, the Duncan's Multiple Range Test was used to determine between which groups the significant differences did occur. An alpha level for significance was set at $p < .05$. An analysis of the reliability of the instrument was determined to be .908 using Cronbach's Alpha.

RESULTS

BIOGRAPHICAL CHARACTERISTICS

Respondents were asked to respond to questions seeking information regarding selected biographical characteristics. A total of 75.3% of the respondents were in the age categories between 20 and 34 years of age. Only 6.2% were 18 and 19 year olds, while 2.4% were 40 years old or older. Females (52.2%) represented a larger percentage of the sample than males (47.8%). Almost two-thirds (62.3%) of the respondents were married, 34.2% had never been married, and 3.5% were divorced. When asked the number of children living with respondents, 43.7% reported none, 36.2% had one or two, 19.2% had three or four, and less than 1% had five or more. A total of 32.1% of the respondents reported that 12 years was the highest level of schooling completed. Only 3.5% had completed less than 12 years and 16.6% completed 16 years of schooling. A majority (54.1%) of the respondents were raised on a farm, 31.7% currently live on a farm, and 56.1% live in a town or city.

LEADERSHIP ABILITY

Objective two of this study sought to determine the perceived leadership ability of young rural adults in North Dakota. Table 1 reports the perceived leadership ability of all respondents. In general, young adults residing in rural areas of North Dakota perceive their leadership ability to be good. The leadership skill statements in the category of General Leadership receiving the highest mean score ratings were: I understand that other people have feelings, motives, and goals of their own ($\bar{x}=5.58$); I like to see conflicts resolved ($\bar{x}=5.54$); I enjoy sharing information with others ($\bar{x}=5.37$); Other people can depend on me to accomplish a task for them ($\bar{x}=5.37$); and I willingly listen to others ($\bar{x}=5.36$). The mean scores indicate the respondents agreed moderately to strongly with the statements.

The leadership skill statements in the category of Speaking Skills tended to receive lower ratings than the other categories. Statements in this category receiving the highest ratings were: I enjoy expressing my ideas on a given issue ($\bar{x}=4.52$); and I feel confident to openly promote issues I feel strongly about ($\bar{x}=4.39$).

Table 1 - Perceived Leadership Ability of Young Rural Adults

LEADERSHIP SKILLS	N	Mean*	S.D.
<u>GENERAL LEADERSHIP</u>			
1. I can motivate people.	574	4.60	0.945
2.**I am unable to inspire people.	575	2.43	1.267
3. Other people accept me as a leader.	574	4.33	1.160
4. People look to me for advice.	575	4.65	1.012
5. I persevere on a project until it's completed.	573	5.09	0.985
6. I consider myself a flexible person.	575	5.14	0.910
7.**Rarely do I take a chance on a new idea.	575	2.51	1.294
8. I'm unafraid of researching questions I don't know.	575	4.32	1.671
9. People seek guidance from me when they're having a difficult time.	575	4.42	1.097
10. I believe my ideas are practical in nature.	575	5.07	0.822
11. I willingly listen to others.	575	5.36	0.819
12.**I find it difficult to consider another person's point of view.	573	2.04	1.254
13.**I feel unconfident with my capabilities.	574	2.76	1.637
14. I'm involved in professional/community affairs.	574	3.64	1.640
15. I am a dependent person.	574	3.62	1.817
16. I'm concerned with maintaining good interpersonal relationships.	575	5.19	0.915
17. I am a valuable contributor to the human race.	575	4.83	0.979
18. I enjoy success and strive for it.	574	5.12	0.986
19. I can see both sides of an argument in question.	575	4.99	0.931
20. I am self-conscious about what I do.	575	4.65	1.365
21. Making mistakes tends to stimulate worry about making another mistake.	574	3.78	1.555
22. I am an effective decision-maker.	575	4.55	1.029
23. I understand that other people have feelings, motives, and goals of their own.	575	5.58	0.696
24. I enjoy sharing information with others.	575	5.37	0.777
25. Others can depend on me to accomplish a task for them.	574	5.37	0.772
26. I consider myself to be intelligent.	575	5.07	0.860
27.**I do not like to be the one to initiate projects.	573	3.24	1.481
28. I'm a person who is original in my ideas and activities.	574	4.39	1.088
29. I have a good sense of humor.	573	5.17	0.797
30. People will confide in me because they consider me to be trustworthy.	575	5.28	0.785
31.**I cannot tolerate frustration and delays.	575	3.85	1.451
32. I like to see conflicts resolved.	573	5.54	0.729
33.**Being tolerant of uncertainty is not an essential part of my life.	559	3.36	1.432
34.**I am a moody person.	575	3.11	1.522
35. I encourage others to get involved in various projects.	573	4.34	1.279
36. I use tact in everyday life.	574	4.70	1.004
37. I am a cordial person.	570	4.96	0.944
38.**I consider myself to be a follower.	574	3.28	1.503
39.**I felt extra-curricular activities in high school were not a very important part of my life.	574	2.59	1.794

Table 1, Cont.

	LEADERSHIP SKILLS	N	Mean*	S.D.
40.**	I am often ignored.	575	2.57	1.411
41.	I feel people respect/admire me for the person I am.	573	4.83	0.967
42.	When someone comes to me with a problem, I try to put myself in their shoes so I can better understand.	575	5.09	0.910
43.**	My emotions interfere with making rational decision.	575	3.13	1.501
<u>SPEAKING SKILLS</u>				
44.	I feel confident openly promoting issues I feel strongly about.	575	4.39	1.324
45.	I enjoy expressing my ideas on a given issue.	574	4.52	1.253
46.	I feel at ease in leading a group.	575	3.61	1.589
47.**	I have trouble speaking in front of large groups.	574	3.84	1.781
48.**	I am hesitant to discuss a difficult situation.	573	3.45	1.525
<u>GROUP LEADERSHIP SKILLS</u>				
49.**	When in a group, I spend more time talking than anyone else in the group.	575	2.51	1.374
50.	I am willing to take charge and lead a group.	575	3.82	1.538
51.**	I'm unable to get others to respect my point of view.	574	2.67	1.185
52.	Other people accept my ideas.	573	4.51	0.872
53.	Making friends/getting along with others is easy for me.	575	4.83	1.176
54.	My ability to convey ideas and convince ideals in the social arena is good.	575	4.06	1.218
55.	People often seat me at the head of a table in a group discussion.	567	2.98	1.383
56.	I usually hold back from taking part in the discussion for a short time before I interact.	574	4.41	1.306
57.	Belonging to organizations is important to me.	575	3.54	1.599
58.	Once I begin a project, I must see it to completion.	574	5.07	1.108
59.**	It isn't easy for me to develop interests in people.	575	2.31	1.414
60.	I enjoy mingling with people in a large group.	575	4.01	1.573
61.**	I'm intolerant of those who deviate from society norms.	564	3.09	1.401
62.	I enjoy meeting new people.	575	5.01	1.062
<u>WORK-RELATED LEADERSHIP</u>				
63.	I view myself as a professional.	564	4.41	1.590
64.	Each year brings me closer to my occupational goal.	563	4.25	1.539
65.**	I am inconsistent in my work habits.	563	2.54	1.590
66.	I consider myself to be an achiever in life.	564	4.71	1.141
67.	I am enthused about my work.	561	4.96	1.056
68.	I work persistently for just cause, not giving up nor backing off.	563	4.97	0.947
69.	I like to maintain good interpersonal relations with my co-workers.	562	5.35	0.871
70.	I am proficient in my work.	561	5.28	0.782

*6 = Strongly agree 5 = Moderately agree 4 = Slightly agree
 3 = Slightly disagree 2 = Moderately disagree 1 = Strongly disagree

**Negatively stated leadership skills. Lower mean scores=more desirable.

Leadership skill statements belonging to the category of Group Leadership Skills tended to have lower ratings than statements in the General Leadership and Work Related Leadership categories. The statements of: Once I begin a project, I feel I must see it through to completion ($\bar{x}=5.07$); I enjoy meeting new people ($\bar{x}=5.01$); Making friends and getting along with other people is easy for me ($\bar{x}=4.83$); and Other people accept my ideas ($\bar{x}=4.51$) were the highest.

Work Related Leadership statements tended to be rated quite high. Those rated highest were: I like to maintain good interpersonal relations with my co-workers ($\bar{x}=5.35$); I feel I am proficient in my work ($\bar{x}=5.28$); I can work persistently for just cause, without giving up or backing off ($\bar{x}=4.97$); and I am enthused about my work ($\bar{x}=4.96$).

COMPARISON OF LEADERSHIP ABILITIES

The third objective of this study was to compare results of the perceived leadership ability of young rural adults using selected biographical characteristics as variables. Due to the length and complexity of tables reporting the comparison data as well as to length restrictions for this report, the individual tables are not included here and discussion has been limited.

There was a significant difference between the mean scores of females and males on 27 of the 70 leadership skill statements. The mean scores of females were more desirable (higher on positively stated items and lower on negatively stated items) for 16 of the 27 leadership skill statements in which there were significant differences. The mean scores of females were more desirable for 28 of the 43 General Leadership skill statements and 8 of the 14 Group Leadership skill statements. Male mean scores were more desirable for 3 of the 5 statements in the Speaking Skills category and 5 of 8 in the Work Related Leadership category. Totally, female mean scores were more desirable than male scores on 41 of the 70 statements.

A significant difference in the mean scores of the leadership skill statements between married and single respondents occurred for only six statements. Mean scores of single respondents were more desirable for five of the six leadership skill statements in which there were significant differences. Single people's mean scores were more desirable than married people on 27 of the 43 General Leadership statements, 10 of the 14 Group Leadership statements, and four of the eight Work Related Leadership statements. Married people had more desirable mean scores on four of the five Speaking Skills statements. Totally, singles had a more desirable mean score on 43 of the 70 leadership statements.

The location where respondents were raised made a very little difference on their perceived leadership ability. Individuals raised on a farm had a more desirable mean score on 37 of the 70 leadership skill statements than respondents who were not raised on a farm. A significant difference in mean scores occurred for only eight of the leadership statements. Mean scores for respondents raised on a farm were more desirable on five of the eight statements in which there were significant differences. Respondents who were not raised on a farm had a more desirable mean score on all five of the statements concerning Speaking Skills, but respondents raised on a farm had a more desirable mean score on nine of the 14 items in the Group Leadership skills.

A comparison was made of respondents' perceived leadership ability based upon their current residence - whether living on a farm or not living on a farm. Although respondents who were not living on a farm had a more desirable mean score on 48 of the 70 leadership skill statements, a significant difference in the mean score only appeared on six of the 43 statements in the General Leadership category, none of the five Speaking Skills statements, one of 14 Group Leadership statements, and two of the eight statements in the Work Related Leadership category.

Because of the amount and complexity of the data gathered while comparing age categories and the limitations of a report of this length, only general findings will be reported. A comparison of respondents' age categories revealed that their ages made little difference on their perceived leadership ability. Persons in the 24 and under age category perceived their leadership ability to be higher than other age groups on 40% of the skill statements. However, a significant difference was found on only nine items. Persons in the 35 and over age category perceived their leadership ability to be higher than persons in the 25-29 and 30-34 age brackets. This may be explained by the fact that more leadership development opportunities have been available in recent years than 15-20 years ago.

The amount of school completed by respondents made more difference on their perceived leadership ability than any other characteristic studied. The more school completed, the higher the perceived leadership ability. Young rural adults who had completed 16 years of school or more perceived their leadership ability to be higher than those with less schooling. Those who had completed 13-15 years rated their level of leadership higher than those completing 12 years or less.

CONCLUSIONS AND RECOMMENDATIONS

Based on these findings, the following conclusions have been drawn:

1. Young adults living in rural North Dakota felt good about their leadership abilities, especially in the General Leadership and Work Related Leadership categories. Speaking skills was their weakest area.
2. The greatest amount of difference in perceived leadership ability occurred between sexes (females being higher) and among various levels of school completed (higher leadership among those with higher levels of school completed).
3. A profile of an individual with the highest level of leadership would be: female, single, no children living at home, raised on a farm, not currently living on a farm, 24 years old or less, and has completed 16 or more years of school.

The following recommendations have been made:

1. The findings of this study may serve as a basis for developing leadership programs in the state. Agricultural educators/Extension personnel having responsibility for leadership development programs should include the leadership skills in which the young adults perceived themselves to be lowest.

2. Because speaking skills were perceived to be the lowest rated category of leadership skills, agricultural educators should encourage other teachers, administrators, and others working with young people to provide opportunities and encouragement for the young adults to develop speaking skills.

3. Agricultural educators might consider providing leadership development opportunities for young adults in their respective communities.

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Leadership Ability of Young Rural Adults in North Dakota

A Critique

Edgar Persons, University of Minnesota, Discussant

General: Dr. Luft did a nice job of building a good case for the study of leadership. On citing the work of several prominent researchers and the resource investment of the Kellogg Foundation he argues convincingly that some knowledge of the leadership ability of rural adults in North Dakota can be instructive.

The purpose of his study is clear with well defined objectives and research questions to guide its development and flow.

The study: To arrive at names and addresses required an innovative approach - using the Drivers License division of the State Highway Dept. Having solved this major problem of identifying a sample, the techniques for the data gathering and analysis were adequately performed.

The response rate in this study (38.3%) was not very high but probably exceeded expectations. Two factors would suggest a low response rate: 1) A long questionnaire with 70 data items in addition to background items, and 2) a sample who had no particular reason to respond. It was very important that the similarity between respondents and non-respondents be firmly established.

There was obviously much data the authors could not report in this short paper. Reporting the 70 items of perceived leadership ability was a good choice. It allowed the author to comment generally on the ranking of items and gave the readers some ideas of the perceived leadership strengths and weaknesses of rural North Dakota adults.

What should we remember about this study? There are three things we might remember from this study.

1. When in doubt, ask! People will respond to questions about themselves and if we remember that perceptions have as much value in planning education as does fact, a good way to find out what perceptions are is to ask.
2. In the aggregate, people can define their strengths and weaknesses when given a instrument that helps them communicate them to others.
3. Leadership is complex. There are no simple answers as to what set of characteristics is most likely to be associated with high perceptions of leadership.

How could this study be improved? The author may consider the following three suggestions if this study were to be replicated in another location.

1. Using all of the tricks of the trade for mailed questionnaires may improve the response rate.
2. The reader would have a higher comfort level if there was more work done to verify that the non-respondents were no different from the respondents.
3. A different form of data analysis might be especially revealing. The author admits to leadership being a fairly complex issue. Perhaps a multiple-regression analysis would be a better way of describing the contributions of the various independent variables to the leadership score.

LEARNING BLOCKS THAT REDUCE AGRICULTURAL STUDENT ACHIEVEMENT

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INTRODUCTION

For years agricultural educators at all levels have been seeking teaching methods and strategies that will increase student learning. Most of these trials were hit and miss methods that sometimes increased student learning and other times reduced learning. This study attempted to discover the underlying causes or blocks that may prevent student learning. When learning blocks are known for a given student, then the learning problem can be diagnosed and proper teaching/advising strategies can be applied.

The nature of learning has a rich foundation in the literature and spans many decades. Learning styles research is more recent and is most heavily concentrated in the last 20 years.

It is useful to define what is meant by learning style. Gregorc (1979) suggests that learning styles are those distinctive behaviors developed by individuals for responding to environmental demands. The National Association of Secondary Principals has accepted the definition of learning style by Keefe (1982) as: cognitive, affective and psychological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment.

The theoretical basis for this study is heavily rooted in the theories of Carl G. Jung and the later applicators of those theories by David Kiersey, Marlyn Bates, Isabel Myers and others. Kiersey and Bates (1984) identified four learning styles that were used in this study. They are: Sensing-perceiving (SP), sensing-judging (SJ), intuitive-thinking (NT), and intuitive-feeling (NF).

Learning blocks, as defined in this study, are those problems and difficulties which inhibit or slow the learning process. Kronskey (1979) found that the causes of learning blocks were: 1. negative self-attitudes, 2. fear of one's own energy and excitement, and 3. a holding attitude where the anxiety of grasping towards life becomes a worse problem than the anxiety it tries to avoid.

OBJECTIVES

1. Identify learning blocks common to agricultural student learning.
2. Predict which learning blocks may be most difficult to overcome for differing learning styles.
3. Identify learning blocks that may effect student grades.

PROCEDURES

A list of 21 learning blocks were identified through a review of literature. This list was sent to 15 College of Agriculture faculty at the

University of Nebraska-Lincoln who have extensive teaching experience for review. As a result, a new list was generated and divided into the four Kiersian learning styles (1984). This list was submitted to five experts in learning in the Departments of Educational Psychology and Agricultural Education at UNL. They were asked to verify the specific learning blocks related to all four learning styles. After four more rounds of reviewing, the final copy of "Learning Blocks Measurement" was designed.

POPULATION/SAMPLE

The population for this study was 1170 students enrolled in the College of Agriculture-UNL, for the 1987-88 school year. The original sample consisted of 127 Agriculture College students of all majors who were attending three large classes. Myers-Briggs personality types of 37 of the original sample were not available from the Agriculture College's data bank and were dropped from the study. Of the 127 students who completed the Learning Blocks Measurement instrument, 84 sets of data were suitable for analysis.

Each student's learning style and GPA were identified from the agricultural college's computer data bank and used for analysis.

ANALYSIS OF DATA

Several statistical procedures were used. The raw data was transferred to mean ranks by using Kruskal-Wallis one-way ANOVA. Using this procedure, 1) all responses toward an item are ranked, 2) each rank order is summed and called rank-sum, and 3) the rank-sum of each type is divided by the numbers of subjects in the group who responded to that item. The result is a mean rank. Differences between groups were analyzed using ANOVA with Fishers LSD test. The alpha level was set at the .10 level because of the exploratory nature of the study.

RESULTS AND CONCLUSIONS

Table 1 indicates the top six serious learning blocks for SPs. SPs differed significantly with the sensing-judging (SJ) and intuitive-thinking (NT) learning styles for "implementing good study habits" and with NTs for "asking questions or seeking assistance", $p < .05$.

Close examination of the learning blocks identified with SP students indicates that students with this learning style may have difficulty in many classrooms. Academic success of students with this learning style may be confounded when they choose not to ask questions, seek assistance, and study. Most classes require a high degree of proficiency in all the learning activities that the SP students identified as blocks, to maintain any degree of academic success. This finding is consistent with studies by Connot (1984) Barrett, Sorensen, (1985), that SP students tend to have a lower academic performance in classrooms.

Table 1

Learning Blocks Highly Rated By Sensing-Perceiving (SP) Students

Rank Order	Learning Block N = 20	Mean Rank	Rated Less Important By
1	Implement good study habits	31	SJ & NT**
2	Ask questions or seek assistance	34	NT**
3	Draw conclusions. If the answer was not in the book, it becomes very difficult for me to accept it.	39	
4	Deal with courses with overwhelming details	41	
5	Attend classes regularly	41	
6	Forget those academic activities which were not required, but I was still interested in doing them.	41	

NOTE: The lowest mean rank implies the most serious learning block.

** $p < .05$

Learning blocks that sensing-judging (SJ) students ranked high are shown in Table 2. Two learning blocks identified by sensing-judging students were: 1) Answer questions that do not have a clear-cut answer, and 2) Answer questions requiring a comparison of different concepts. For both of these learning blocks, the sensing-judging students significantly differed from intuitive-feeling students ($p < .05$, $.10$).

Table 2

Learning Blocks Rated Highly by Sensing-Judging (SJ) Students

Rank Order	Learning Block N = 41	Mean Rank	Rated Less Important by
1	Answer questions which have no clear-cut answer.	38	NFs**
2	Answer questions requiring comparison of different concepts.	39	NFs*
3	Communicate effectively, either verbally or in the written form.	39	
4	Look for reasons behind the facts.	41	
5	Draw conclusions if the answer was not in the book.	42	

Note: The lowest mean rank implies the most serious learning block.

(* $p < .10$ ** $p < .05$)

Each of the blocks identified by sensing-judging students had a central theme that seemed to present a problem learning situation, that theme being, when information is not presented in a straight-forward manner or leaves holes for the imagination to fill. Intuitive-feeling students prefer just the opposite, and do not identify ambiguity as a learning block. This finding is consistent with the findings of Myers (1985).

Data in Table 3 helps to explain more clearly the findings reported in Table 2. Other temperament styles differed with the intuitive-feeling students in all but one learning block. All three of the temperaments SJ, SP and NT differed significantly from the NF students on: 1) remembering facts, and 2) forget academic activities which were not required but I was interested in them. These two blocks are quite different, but consistent with learning preferences for NF students. NF students have difficulty remembering facts not connected to a wholistic concept. The second block denotes the wide and varying interests of this temperament.

Learning block three dealing with courses with many details is similar to block one and is significantly different for SJ students ($p < .05$).

Implementing good study habits was an NF learning block that was not identified by NT students ($p < .10$).

Table 3

Learning Blocks Rated Highly by Intuitive-Feeling (NF) Students

Rank Order	Learning Block N = 13	Mean Rank	Rated Less Important By		
1	Remember facts.	26	SJs	SPs**	NTs*
2	Forget academic activities which were not required but I was interest in doing them.	26	SJs	SPs**	NTs
3	Taking courses with overwhelming details.	30	SJs**		
4	Knowing what to do with materials I did not understand.	34			
5	Implement good study habits.	37	NTs*		

Note: The lowest mean rank implies the most serious learning block.
(* $p < .10$ ** $p < .05$)

Data in Table 4 indicates that intuitive-feeling (NF) and intuitive-thinking (NT) students identified similar learning blocks. The NT learning block: "cope with courses in which I was not interested," was significantly different from SJ students ($p < .05$). NT students identified "attending classes regularly," as a learning block significantly different from SJ and SP students ($p < .10$).

Table 4

Learning Blocks Rated Highly by Intuitive-Thinking (NT) Students.

Rank Order	Learning Blocks N = 10	Mean Rank	Rated Less Important By
1	Cope with courses in which I was not interested.	30	SJs **
2	Attend classes regularly.	32	SJs** SPs*
3	Forget academic activities which were not required but I was interested in doing them.	38	
4	Know what to do with the materials I did not understand.	39	
5	Remember facts.	41	

Note: The lowest mean rank implies the most serious learning block.
(*p<.10 **p<.05.)

In sum, 9 out of 15 learning blocks were significantly different from one temperament group to another. The most significant finding in this study seems to be that sensing and intuition are the most powerful personality type factors in predicting what may cause a problem in learning. These findings are consistent with Myers and McCaulley (1985) and McCaulley (1976)

Table 5 shows how learning blocks affected student's grades. Students with a high GPA tended not to identify the learning blocks identified in Table 5, they were more often identified by students with low GPAs. "Implementing good study habits" was at the top of the list for Table 1, thus it can be surmised why SP students may achieve less in the classroom, this is consistent with findings by Connott (1984).

IMPLICATIONS

The findings of this study clearly indicated that what may be a learning problem for one group of students may not be a problem for others. In fact, students with other learning styles may not even identify it as a block at all.

Recognizing learning blocks can help students develop coping strategies to overcome them. Learning blocks provide a basis for diagnosing learning difficulties which can be useful to teachers and advisors.

Findings from this study indicates ways in which teachers can identify those teaching practices that cause students difficulty in achieving in the classroom. It suggests that teaching is by far more complicated than knowing what methods to use. Findings also imply that if teaching is ever going to become effective, then attention to factors inherent in style becomes imperative. This data is a helpful addition to the growing body of knowledge of how students learn.

Table 5

Relationship of Learning Blocks With Students' GPA

No.	Learning Block N = 117	Correlation Coefficient	Significance Level
1	Implement good study habits	-0.42	0.00
2	Manage or allocate my time to different learning activities	-0.34	0.00
3	Communicate effectively, verbally or written	-0.25	0.01
4	Set a reasonable expectation from myself	-0.21	0.05
5	Cope with courses in which I am not interested	-0.20	0.05
6	Answer questions requiring comparison of different concepts	-0.19	0.05

RECOMMENDATIONS FOR FURTHER STUDY

1. Additional studies using the Learning Block Measurement with differing samples would be advised.

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LEARNING BLOCKS THAT REDUCE AGRICULTURAL STUDENT ACHIEVEMENT

A Critique

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The authors begin correctly with the fact that agricultural educators seek teaching techniques that improve student learning. They continue that one means of increasing student learning is to remove problems and difficulties inhibiting learning. These inhibitors, called learning blocks, served as the principal concern of the study. I believe the study has a firm base--both practical and theoretical.

The objectives were stated plainly; but, after learning about the research design and findings, I suggest that two of the three be restated: Objective 2 was to "predict which learning blocks may be most difficult to overcome for differing learning styles." In the paper, the authors determined which learning blocks were most characteristic of each of the four learning styles--not which were most difficult to overcome. Similarly, Objective 3 was to "identify learning blocks that may effect [sic] student grades." The findings, however, revealed the relationship between students' GPAs and their ratings of each of the learning blocks. And, yes, while a reader may infer that a learning block that is related to students' grades does affect their grades, the researchers did not--and, in fact, could not--determine that through this descriptive research design. We must remember that descriptive research simply cannot determine cause-and-effect; at best, it can reveal relationships.

The authors reported that they identified 21 learning blocks through the literature review; I recommend that they reference the literature from which the learning blocks were identified. Also, somewhere in the paper, I would like to have seen a list of all of the 21 learning blocks. The list was sent to faculty colleagues for review; they also divided the list "into the four learning styles." I do not understand how the learning blocks could be divided "into learning styles." Additional reviews of the list resulted in an instrument, the "Learning Blocks Measurement." Again, I would urge the authors to give us readers bibliographic information--a source--for the instrument. This provision would facilitate the authors' recommendation that others conduct "additional studies using the 'Learning Block [sic] Measurement' with differing samples...." (I suspect that the instrument is unpublished, but we could be told even if the instrument is merely a publication of one author's home department and university.)

The "responding" sample for this study consisted of 84 subjects. This number is probably sufficient assuming there are not subsamples taken from the sample. The procedure in this study was to subdivide the sample based on learning style. The four learning styles represented in the study had n's of 20, 41, 13, and 10. One must realize that the probability of a type 2 error is substantially higher with n's of 10 and 13, for example, than with 30 or so subjects.

This study adds to programmatic research initiated several years ago; I urge the researchers to continue their efforts.

LEARNING STRATEGIES THAT AGRICULTURAL STUDENTS USE SUCCESSFULLY AND UNSUCCESSFULLY

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INTRODUCTION

It is a well known fact that students at all levels have various rates of achievement. Often these differences are associated with student intelligence. However, this line of thinking does not take into account that students have differing learning styles that strongly effects their achievement.

Since 1960 many researchers have been involved in examining learning styles. Some studies have found similarities, contrasts, and overlappings of the various learning theories (Keefe, 1979, Kirby, 1979). Students learn over time to develop new strategies that help them cope with difficult learning situations. Such approaches can be viewed as strategic reactions to a particular learning situation, which may depend on such factors as level of interest, anxiety or as more stable styles linked with the features of personality and motivation (Ford, 1981).

A review of the literature reveals that no previous research studies have attempted to determine how different temperament or styles develop their learning skill. Wilson (1981) and McFall (1976) emphasized the need for studies to investigate which coping techniques and effective solutions be applied by differing students.

The idea for this research was supported by Kirby (1979), when he stated that "it is especially important to begin research on: 1) how transfer skill acquisition or style augmentation may best be accomplished at the various life stages as well as in the Peagetian development stages, and 2) how the cognitive learning style is used at these stages."

The primary focus of this study was to determine how students of differing temperament styles adjusted or coped with different academic learning situations. Temperament theory developed by David Kiersey and Marlyn Bates (1984) and Golay (1982) form the theoretical foundation for the use of temperament style. Goldfried and D'Zurilla's (1969) behavior-analytic assessment model served as the process by which the coping styles inventory was developed.

Coping strategy as defined for this study is the conscious and planned effect or pattern of effects to handle and deal with problematic situations.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine if students of differing personality temperaments used different coping strategies to solve problems they faced in academic learning, and how those selected coping strategies affected their grades. The following objectives guided the study:

1. Determine the coping strategies used by agricultural students of differing personality temperaments.
2. Identify the coping strategies used by agricultural students in academic settings that increased achievement.

PROCEDURES

The population for the study was 1170 students of all majors in the College of Agriculture at the University of Nebraska, enrolled for the 1987-88 school year. The sample was all students enrolled in three classes that met at the same time to eliminate duplication. Of the 230 students that were enrolled, eight responses were incomplete, thus leaving 222 students for data analysis. All levels of students were represented in the sample. Freshmen were the largest percentage (33%), sophomores (19%), Juniors (21%) and Seniors (27%).

The Coping Strategies Inventory (CSI) which was designed for the study contained 52 strategies, it was administered to students while in class. Student's personality temperaments, GPA and gender were obtained from the University of Nebraska College of Agriculture, data bank.

The Coping Strategies Inventory (CSI) was designed by using Goldfried and D'Zurilla's (1969) behavioral-analytic assessment model, which specifies a step-by-step approach to designing a questionnaire including a pilot test. The reliability of the Coping Strategy Inventory achieved a Cronbach's alpha of .82. Validity of the CSI was achieved by assuming that those coping strategies that had a greater contribution to a student's cognitive development are applied by high achieving students more than low achieving students. When a correlation with students GPA and each item of the CSI was made, a coefficient of .68 was obtained.

Student personality temperaments were determined by using the Myers-Briggs Type Indicator (MBTI), (1982) which is now the most widely used instrument of its kind in the U.S. The MBTI has the following reliabilities: .82 for extraversion/introversion (E/I); .84 for sensing/intuition, (S/N); .83 for thinking/feeling (T/F); and .86 for judging/perceiving (J/P). Validity of the MBTI is as follows: E/I=.58; S/N=.51; T/F=.48; and J/P=.49. Four Kiersian (1984) temperaments were used in this study, they were: sensing-judging, (SJ) sensing-perceiving (SP), intuitive-feeling (NF), and intuitive-thinking (NT). Temperament is defined as observable behavior that is the result of a unique combination of personality preference traits.

ANALYSIS OF DATA

All analysis was done using SPSS-X on the University's mainframe computer. Mean ranks and significant differences were determined using Kruskal-Wallis one-way ANOVA. ANOVA with Fisher's LSD test was applied to determine differences between groups. An alpha level of .10 was used to determine significance levels of items of the CSI because of its exploratory nature, and .05 for all other comparisons.

RESULTS/DISCUSSIONS

The distribution of students in the study between personality temperaments was not equal. Forty three percent were sensing-judging (SJ), 29 % sensing-perceiving (SP), 15% intuitive-feeling (NF), and 13% intuitive-thinking (NT). This finding for Agricultural College classes at University of Nebraska-Lincoln is almost identical to that found by Barrett (1985).

From the results of the Coping Strategies Inventory, students identified 49 out of 52 different strategies that were important for them. By personality temperament, a listing of the top ten coping strategies was identified for each. The top coping strategies for the sensing-judging (SJ) temperament are listed in Table 1. Students of the sensing-judging (SJ) temperament chose the strategy, "motivate myself by thinking about the reward that I receive once I am finished," most frequently. Mean ranks were nearly the same for the sensing-judging (SJ) student's choice of strategies.

It is interesting to note that for 8 out of the 10 strategies SJ students chose, the other 3 temperaments SP, NT and NF, significantly choose not to use as frequently, ($p < .05$, $.10$). The three coping strategies most frequently identified by sensing-judging (SJ) students are: 1) motivate myself by thinking about the rewards that I receive once I am finished, 2) study in the library to get rid of distractions, and 3) develop a plan to overcome the difficulty. This finding is quite consistent with Kiersey's (1984) temperament theory in that SJs are disciplined and planful persons.

Table 1

Top Coping Strategies Performed by Sensing-Judging (SJ) Students

Order	Coping Strategy	Mean Rank	Less Frequent Use By
N=50			
1	Motivate myself by thinking about the reward that I receive once I am finished	66	SP**
2	Study in the library to get rid of distractions	66	SP*
3	Develop a plan to overcome the difficulty	66	SP*
4	Reduce my extracurricular activities	65	NT*
5	Define exactly my learning difficulties	65	SP**
6	Skipping class causes difficulties, so I try to attend classes regularly	64	SP*
7	Keep myself in good physical shape to deal better with learning problems	64	
8	Use a variety of resources or possibilities	64	NF*
9	Talk with the instructor on a one-to-one basis	64	SP**
10	Need outside help to get rid of difficult problems in my learning activities	64	

NOTE. The highest mean rank implies the most frequently used coping strategies. (* $p < .10$. ** $p < .05$.)

The coping strategies for sensing-perceiving (SP) students is shown in Table 2. Eight out of 10 strategies identified by SPs were significantly different from the other three temperaments ($p < .05$, $.10$). The three most frequently identified coping strategies for SP students were: 1) drop the courses in which I am not interested, 2) postpone unpleasant or difficult learning tasks even if I could perform them immediately, and 3) get help from friends or classmates rather than from the instructor or TA.

These findings are quite consistent with the behavior patterns described by Kiersey (1984). Sensing-perceiving students tend to have a relaxed attitude about life. Golay (1982) describes the SPs as not wanting to plan or organize and when bored they turn to activities they enjoy.

Coping strategies preferred by intuitive-feeling (NF) students is displayed in Table 3. Of the four temperament groups, the NF students differed most from the other groups, significant differences were found for all 10 coping strategies ($p < .05$, $.10$). The SP students differed with the NFs on 8 out of 10 strategies, and the SJ students differed on 5 out of 10 strategies.

Table 2

Top Coping Strategies Performed by Sensing-Perceptive (SP) students.

Order	Coping Strategy N=34	Mean Rank	Less Frequent Use By
1	Drop the courses in which I am not interested	74	SJ NT**
2	Postpone unpleasant or difficult tasks even if I could perform them immediately	68	SJ**
3	Get help from friends or classmates rather than from instructor or TA	68	NT*
4	When a learning problem is bothering me, I try to do something pleasant such as sleeping or going to the movies	67	SJ*
5	Ignore the difficult learning task	66	SJ*
6	When I am faced with a boring or difficult course, I try to take the course another time such as summer	65	
7	Do the shortest things first, then I start with the things which take me more time	63	
8	I cram before tests	62	NF**
9	Treat myself with something I like	61	
10	When I cannot solve my learning problems, I admit to myself that I cannot deal with the problem	61	NF**

Note: The highest mean rank implies the most frequently used coping strategies. (* $p < .10$ ** $p < .05$)

Table 3

Top Coping Strategies Performed by Intuitive-Feeling (NF) Students.

Order	Coping Strategy N=18	Mean Rank	Less Frequent Use By		
1	To treat myself with something I like (candy, movie, . . .)	77	SJ	NT**	
2	Make a calendar of responsibilities and due date	77	SP	NT*	SJ*
3	Define exactly my learning difficulty	76	SP**	NT	
4	When I cannot solve my learning problems, I admit to myself that I cannot deal with the problem	75	SP	NT	SJ**
5	Sit at a specific place in the classroom to be able to concentrate	73	SP*	SJ*	
6	Approach a solution systematically	72	SP**		
7	Reinforce myself verbally (i.e. good job..)	72	SP**		
8	Get away from friends when they distract my concentration	70	SJ*		
9	Do not give up but study even more	69	SP*		
10	Talk to the teaching assistant rather than going directly to the instructor	69	SP*		

Note: The highest mean rank implies the most frequently used coping strategies. (* $p < .10$ ** $p < .05$)

This finding indicates that the NF student's style of coping with learning situations is more unique than any other of the temperaments. Golay (1982), describes the NFs as conceptual-global learners who are determined to find true meaning in the world. Kiersey (1984), refers to the NFs as persons seeking to be unique; this finding is consistent with both theories.

Findings for intuitive-thinking (NT) students is depicted in Table 4. NTs had the least number of significant differences with other temperaments, only 5 out of 10 ($p < .05$, .10). NT students differed with SP, SJ and NFs on the strategy: when I cannot do anything about my learning activity, I prefer not to complain. The NTs differed with SPs on : 1) observe successful students to learn how they deal with their learning difficulties and 2) observe and evaluate my own progress in overcoming the learning difficulty.

Golay (1982), refers to the NTs as being conceptual-specific, preferring to solve problems in a serious manner. The findings of this study depict that kind of student.

Table 4

Top Coping Strategies Performed by Intuitive-Thinking (NT) Students.

Order	Coping Strategy N=15	Mean Rank	Less Frequent Use By
1	When I cannot do anything about my learning activity I prefer to not complain	77	SP NF** SJ*
2	Observe successful students to learn how they deal with their learning difficulties	73	SP**
3	Observe and evaluate my own progress in overcoming the learning difficulties	70	SP**
4	Tell myself not to worry about others' reactions to the questions I ask the instructor	69	
5	Speak up in the classroom when something needs to be clarified	68	
6	Get the most urgent assignments done first	67	
7	Do the shortest things first, then I start with the things which take me more time	67	
8	Cram before tests	67	NF*
9	Talk with the instructor on a one-to-one basis	66	SP**
10	Rely on my own experience and ability in dealing with the difficulty	65	

Note: The highest mean rank implies the most frequently used coping strategies. (* $p < .10$ ** $p < .05$)

The selection of coping strategies by students and their resultant relationship to grades is shown in Table 5. There were 20 strategies identified that were positively related to GPA, ($p < .05$, $.001$). To save space only 5 positive and 5 negative strategies are shown in Table 5. "Do not give up but study even more" had the highest positive correlation of (.43, $p < .001$). The strategy that had the highest relationship to negative GPA was: "I tend to postpone unpleasant or difficult learning tasks even if I could perform them immediately, ($-.27$, $p < .001$).

In sum, of the 20 coping strategies that had a positive relationship to student GPA, SJ students listed 6 positive and one negative strategy, NF students listed 4 positive and no negative strategies, while NT students listed only 2 positive and no negative strategies. Students with the most negative responses were the SPs, they listed 6 negative and no positive strategies. Thus, SJ, NF and NT students had more positive than negative strategies. While SP students had all negative coping strategies that related to GPA.

In a study of college students by Barrett (1985) and a study of high school students, Connot (1984) found that NF and SJ students ranked at the top for GPA, and NT and SP, in that order, ranked at the bottom.

Table 5

Coping Strategies and Their Relationship to Students' GPA

Number	Coping Strategy N = 213	Correlation Coefficient	Significance Level
1	Do not give up but study even more	.43	.001
2	Set goals and expectations for myself in dealing with learning difficulties	.23	.001
3	Start as early as possible to study and work on my learning tasks	.23	.001
4	Study on a regular basis	.24	.001
5	Set aside enough time to deal with the difficulty	.24	.001
6	Postpone unpleasant or difficult learning tasks even if I could perform them immediately	-.27	.001
7	Get help from friends or classmates rather than from the instructor or TA	-.27	.001
8	Ignore the difficult learning tasks	-.26	.001
9	Need outside help to get rid of difficult problems in my learning activities	-.23	.001
10	Drop the courses in which I am not interested	-.17	.05

CONCLUSIONS

The results of this study make more clear how different kinds of students cope with similar learning situations in an academic setting.

Teachers at all levels should be advised that their students will attempt to use coping strategies peculiar to their temperament, and that some of those strategies could be harmful to their academic performance. This same advice should also be considered by gender, in that, males tend to choose less positive strategies than do females.

Finally, the results of this study adds valuable information to the already growing body of knowledge as to how students learn. If teachers continue to ignore such information, teaching and learning as we know it will remain basically the same, namely, that students will fail to reach their potential.

RECOMMENDATIONS

1. College advisors and teachers should be apprised of how students attempt to cope with the learning environment.
2. Attempts by teachers to advise students how to cope should be tempered with the knowledge that a students coping strategy may be deep rooted in the student's temperament and thus not easy to change.
3. Additional studies are needed to validate this study and the Coping Strategies Inventory.

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LEARNING STRATEGIES THAT AGRICULTURAL STUDENTS USE
SUCCESSFULLY AND UNSUCCESSFULLY

A Critique

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Obviously, this study is closely related to the study on learning blocks; many of the accolades and some of the suggestions for that study apply to this report. First, and again, I compliment the authors for continuing a programmatic research thrust. Many of us--me included--should follow their example.

The purpose of this study was to determine coping strategies used by agriculture students of differing personality temperaments, and "how those selected coping strategies affected their grades." The descriptive design does not permit the researchers to accomplish the latter part of the purpose. They can only determine if the use of selected coping strategies was related to their grades--not whether the strategies affected their grades. Let me illustrate the importance of this distinction: The authors found that use of the coping strategy "need outside help to get rid of difficult problems in my learning activities" was negatively related to students' GPAs. If one concludes that the need for outside help affects grades negatively, then one might recommend that a student not seek outside help. Actually, I suspect that the cause and effect are reversed in this instance--though I can't prove it. That is, I would guess that a cause of the need for outside help is low grades--not the other way around. So, clearly, the authors were not really trying to "identify coping strategies . . . that increased student achievement; rather, they were trying to identify coping strategies that were related to student achievement. Then, they (or some of us) might design an experimental study to examine the ability of coping strategies to increase achievement.

The total number of subjects in this study was 222, but only 117 subjects were identified with one of the four temperament categories. I would like to know what the temperament of the other 105 subjects. Similarly, 52 coping strategies were identified and contained in the Coping Strategies Inventory, but we are privy to only 35 or so of them. And, though the 35 listed were "the most frequently used coping strategies," I really did not understand the mean ranks (e.g., with only 52 items, how can an item have a mean rank of 74?).

One conclusion of the study--as reported in the paper--was not supported by or related to the findings: that males tend to choose less positive strategies than do females. Also, the other conclusions were more nearly summary statements or recommendations than actual conclusions. On the other hand, the recommendations from this study are valuable; they urge teachers to know how students attempt to cope with the learning environment and they caution us that our advice to students about how to cope should be tempered with the knowledge that students with differing temperaments may need different advice. The suggestions are practical and worthwhile. Moreover, the study as a whole is practical and worthwhile. I thank the authors for sharing it with us.

MENTOR TEACHERS' PERCEPTIONS OF THE MENTORING EXPERIENCE

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INTRODUCTION

Mentoring has become increasingly accepted as a support system for helping beginning teachers transition into the first year of teaching (Huffman & Leak, 1986). A mentor is a "...teacher, role model, consultant, friend, door opener, confidant, advocate, protector, listener, and counselor" (James, 1987, p. 11). Mentors are responsive to the human, social and psychological needs of beginning teachers (Galvez-Hjornevik, 1986). Johnston and James (1986) stated, "mentoring is an informal and naturally occurring personalized process of 'people helping people' (p. 21). Mentors have provided beginning teachers on-going personal and technical assistance and psychological support (Egan, 1986; ERIC Clearinghouse on Teacher Education, 1986; Simon & Wardlow, 1989).

Mentoring is a two-way process which allows both the beginning teacher and mentor to meet their needs for socialization, career adjustment and generativity. In many teacher induction programs, mentoring has become the primary component of a comprehensive staff development plan to create professionally rewarding roles for experienced teachers while passing on existing knowledge to a younger generation of teachers (ERIC Clearinghouse on Teacher Education, 1986; Schulman, 1986; Weber, 1987).

A commitment toward helping a younger teacher succeed, through mentoring, has contributed toward a rejuvenated commitment toward teaching, positive change, professional development and new avenues for recognition and self-renewal rather than stagnation in the profession (ERIC Clearinghouse on Teacher Education, 1986; Weber, 1987). Mentoring has rekindled in mentors a sense of pride and excitement about teaching and has helped experienced teachers to realize a new sense of self-worth (Galvez-Hjornevik, 1986).

Research has revealed the primary positive and beneficial aspects of mentoring. Very few studies have focused upon the nature of what it was like to be a mentor. The number of agriculture teacher education programs which are dependent upon mentors for helping beginning teachers transition into the profession are increasing. In order to successfully meet the inservice needs of mentors, a more comprehensive understanding of the mentoring experience is needed. The negative and frustrating aspects of what it is like to be a mentor should be determined.

AIMS AND RESEARCH QUESTIONS

The overall goal of this study was to determine the effectiveness of a mentor-induction program that used experienced teachers as mentors of beginning secondary agriculture teachers to help them in transitioning into the first year of teaching. The portion of this study from which this article is based, sought to provide a greater depth of understanding of the mentoring experience by eliciting the feelings, perceptions and insights of mentors.

Five questions guided this study: 1) what did mentors perceive as their roles?, 2) what was the nature of the mentoring relationship?, 3) how did mentors benefit from the mentoring experience?, 4) what major contributions

were mentors able to provide beginning teachers? and, 5) what were the most difficult or frustrating aspects of being a mentor?

PROCEDURES

This was an interpretive study using qualitative research procedures. The participants included nine in-school and nine subject matter mentors. Each served as a mentor of a beginning secondary agriculture teacher for one academic year. In-school mentors were experienced teachers who taught in the same school building and at the same grade levels as their beginning teachers but in different subject areas. Subject matter mentors taught secondary agriculture in a neighboring school district. In-school mentors were selected by beginning teachers and subject matter mentors were assigned to them by the Department of Agricultural Education at the University of Minnesota.

Data were collected from the "Mentor Insights Form" and systematic individual interviews using a Posttest Only Control Group Design (Campbell & Stanley, 1963). The mentor insights form consisted of five open-end questions designed to identify the positive and negative aspects of what it was like to be a mentor. Questions sought to uncover personal insights, feelings, discoveries, benefits, contributions, satisfactions and frustrations as they carried out their roles as mentors. Participants were asked open-ended and probing questions to elicit a greater depth of understanding.

DATA ANALYSIS

Data were analyzed using content analysis techniques. Data were organized and reported as major themes and concepts. Statements elicited from the participants were used to support and explain the study's major themes and conclusions. Findings of a qualitative nature were validated through rational discourse, inter-subjective agreement and joint interpretation.

RESULTS AND CONCLUSIONS

Mentors' Perceptions of Their Role(s)

Personal Assistance and Psychological Support

Sounding Board and Sympathetic Ear

Mentors were honored and proud to have been asked to serve as a mentor of a beginning agriculture teacher. It was a positive boost to their egos, confidence and professional status. Being a mentor was gratifying, rewarding and a stimulating experience but required much patience and cooperation.

Mentors perceived themselves as colleagues and sought to make themselves available to beginning teachers. Mentors were objective, non-judgmental, understanding and empathetic. Mentors were sounding boards who listened sympathetically to the problems and frustrations of beginning teachers.

"I tried to be a good listener. I let him express his feelings and tried not to react in a judgmental fashion."

Cheerleader

Mentors provided beginning teachers with positive reinforcement, support, ideas, suggestions, encouragement, advice, counseling and guidance. Mentors provided beginning teachers friendship, companionship and direction. They reassured beginning teachers that all teachers had problems and helped them in maintaining a positive attitude toward teaching. Mentors helped them recognize their limitations as first year teachers, expressed the importance of preparation and persistence, offered suggestions and encouraged beginning teachers to learn from their mistakes. In-school mentors claimed they were successful in decreasing anxieties and in increasing the level of self-confidence of their beginning teachers.

"I gave him re-assurance, lifted him up, encouraged him and tried to get him to overcome his own insecurities."

"I stressed the importance of maintaining a positive attitude in spite of the kids who were non-performers and who showed only a marginal interest in his program."

"I tried to point out that he was trying to do too many things the first year."

Mentors became closer friends with beginning teachers than with student teachers. They felt more responsible and chose to make a longer term commitment toward helping beginning teachers succeed.

"It is a different role than supervising a student teacher. You take a more personal interest in his success, you make a long term commitment and you feel more responsible."

* * Nature of Mentoring Relationships

Mentors thought of themselves as a father figure, big brother, friend or role model. In-school mentors described their relationships as trusting, friendly, comfortable, confidential, open and collegial. In-school mentors spent more time with their beginning teachers and were more likely to have fostered a caring relationship than subject matter mentors. Many subject matter mentors had developed professional relationships, but only three of nine, had developed close caring relationships with their beginning teachers. Personality differences, physical distance which separated them, lack of time for sharing, and in addition, being assigned the responsibility of helping someone they did not know made it difficult for subject matter mentors to foster a close caring relationship.

Conflict of roles and positions limited communication between one beginning teacher and his mentor, who was also the high school principal. The relationship that formed between these two individuals was neither close nor collegial.

"Being an administrator, I never did feel like his mentor. I felt like a hybrid. It was more of an administrator/teacher role. It was not collegial. It was not a true mentoring relationship."

Benefits of the Mentoring Experience

Recognition of Growth and Understanding About Teaching

The mentoring experience caused mentors to re-live their first years of teaching. They realized: 1) how much they had grown as a teacher, 2) how important self-confidence was to a teacher's success, 3) how years of experience had increased their understanding about teaching and, 4) that there were no good solutions to some problems in teaching.

"It reminded me of what teaching was really like that first year and all the obstacles I had to overcome in order to improve."

"I have noticed my growth as a teacher. I have a greater understanding of the actions I have taken in handling kids and the way I teach."

Increased Dedication Toward Teaching

Mentoring has given experienced teachers new insight into their own strengths and weaknesses. It has increased their self-confidence, increased their dedication toward teaching and has energized them to work harder. Mentors were stimulated to become better prepared to teach classes, sharpen their instructional skills, improve their performance in the classroom and to make needed changes in their own curriculums and programs.

Professional Development, Insight and Commitment

Mentors grew professionally as they accepted responsibility for the professional development and success of a younger inexperienced teacher. Mentors recognized that they looked at problems much differently than their beginning teachers. They realized that different perceptions influenced which approaches might be selected to solve or prevent problems. Beginning teachers did not have the experience nor insight into problems and did not understand the reasons underlying them that knowledge and experience has provided experienced teachers. They recognized that beginning teachers have overcome many of their problems through the desire to succeed, whereas, experienced teachers have applied knowledge and patience, learned through years of teaching, as a basis for dealing with or preventing problems.

"I realized how much experience and insight about teaching I have gained in thirty years of teaching. Experience tells me that the things young teachers worry about I also worried about when I was young. Youth and vigor and not having a big picture on what was going on helped them to overcome those problems. Knowledge and patience that is gained with experience has helped those who are older to avoid or deal with problems."

The mentoring experience has made them more willing to help their colleagues. One in-school mentor was selected to be head mentor of a cooperative pilot project which included eight school districts.

"This experience has given me the knowledge I need to coach other teachers and train them to become mentors."

Increased Awareness

In-school mentors became more sensitive and understanding about the needs and problems of beginning teachers. They gained an appreciation of secondary agriculture and were more aware of why many agriculture teachers burnout. Mentoring has reinforced, among subject matter mentors, the value of incorporating Future Farmers of America and Supervised Occupational Experience activities into classroom instruction. Two in-school mentors became more receptive of the need to change and to adopt new technologies. Their beginning teachers taught them how to incorporate computers into their classrooms.

"I became aware of why agriculture teachers burnout. They are snowballed with new responsibilities."

Increased Feelings of Self-Worth

Mentors appreciated the mutually reinforcing feedback provided to them by their beginning teachers. The positive feedback reflected back toward them by beginning teachers left them with a sense of accomplishment and enhanced their feelings of self-worth as a teacher.

Contributions of Mentors

Technical Assistance

Classroom Management

In-school mentors helped instill effective classroom management behaviors and techniques for managing discipline in beginning teachers. They assisted them in developing rules, procedures and routines for managing their classrooms, handling discipline and in dealing with problem students. In-school mentors credited themselves with sharing classroom instructional tips and techniques which have worked for them.

"I helped him manage his classroom behavior problems by teaching him an assertive discipline system."

"Classroom discipline dominated our conversations."

In-school mentors, who were also industrial arts teachers, taught beginning teachers the importance of shop safety, shop organization, housekeeping and equipment maintenance. Both industrial arts teachers and subject matter mentors shared procedures for incorporating a point system for grading students in the shop.

Teaching Materials and FFA

Subject matter mentors helped beginning teachers locate instructional materials. They shared materials needed to prepare and train students for FFA contests. They informed beginning teachers of contest materials, applications and deadlines for their submission. Subject matter mentors provided beginning teachers advice in preparing for the FFA convention, annual parent-member banquet, officer elections and other chapter activities. Others invited

beginning teachers and their FFA chapters to travel along with their chapters to FFA contests, events and the FFA convention.

Curriculum and Program Development

Subject matter mentors shared ideas with beginning teachers about structuring their curriculums, building their programs and increasing their enrollments, including the number of female students enrolled in agriculture. They shared ideas about what to teach and how much instructional time to devote to each subject area.

Reflective Thinking

Mentors encouraged beginning teachers to think reflectively in order to solve their problems and improve their teaching. Mentors helped them to identify problems, possible reasons underlying the existence of problems and potential solutions and consequences of their decisions. Mentors encouraged beginning teachers to make their own decisions.

"I encouraged him to think through matters. I used an objective approach that required him to think in a reflective manner. After teaching a class, I had him ask himself three questions: 1) What is it that I was trying to accomplish? 2) Did I accomplish it? 3) What should I do different next time?"

Politics of the School

In-school mentors helped beginning teachers understand the political aspects of the school, including standard operating procedures, school policies and practices and the importance of the teacher's union.

Quality of Education

Mentors suggested that the entire educational system benefited from mentoring. Students receive better quality instruction and the school benefits from a higher quality program.

Frustrating Aspects of Mentoring

Facilitating the Process of Self-Discovery

Nearly all mentors expressed frustration in the process required to let beginning teachers learn through self-discovery. It required much cooperation and patience of mentors to allow beginning teachers time to think through their mistakes in order to reach their own conclusions.

"It was most frustrating to watch the young teacher struggle with problems that you would like to step in and solve immediately but realize that a fledgling must spread his own wings in preparation for flight. Obviously, learning happens through making mistakes even if some are hard to watch."

It was frustrating for mentors to listen to young teachers blame administrators for their problems. Mentors expressed difficulty in explaining

to beginning teachers that they were ultimately responsible for the success or failure of their programs and that they had to earn the support of their administration. Further, it was frustrating for many mentors to tell beginning teachers that there were no simple solutions to some of their problems.

Failure to Develop Caring Relationship

Mentors expressed the importance of being selected by a beginning teacher. Personal characteristics, incompatibilities, professional roles and the level of professional abilities of beginning teachers were major factors which influenced whether or not mentors fostered a close caring relationship.

"I did not want to be associated with a beginning teacher who did not have the ability to teach. I was appointed to him. It was difficult to be positive. I did my best to listen, be friendly and patient and to offer him good suggestions. A friendship did not develop because we were too different individuals."

Observation

Observation allowed mentors to gain a more comprehensive understanding of the needs and problems of beginning teachers. It encouraged openness and honesty and facilitated discussion. Many of the mentors were uncomfortable in observing their beginning teachers in the classroom. They felt unprepared to evaluate others and insisted that beginning teachers benefited more from being able to observe their teaching.

"My presence in the classroom made him very nervous. He was much more relaxed and asked better questions after he had observed my teaching."

Need for Released Time

Subject matter mentors were frustrated with the lack of time they had for communication, observation and for sharing teaching materials with beginning teachers. The amount of distance between them increased the burden of being away from their own classes and students. In-school mentors were in a better position to provide immediate feedback and reinforcement. Mentoring was taxing and a burden on their personal time. In-school mentors needed more released time for observation and interaction. Subject matter mentors felt guilty about asking their principals for more released time from school.

RECOMMENDATIONS

Beginning teachers should be allowed to select their own mentor(s). Mentors should be colleagues who are well established in the school system, not supervisors. Subject matter mentors recommended that a mentor be selected from within the home school district because it was difficult for teachers outside the school system to help them with immediate problems, internal difficulties and politics. Beginning teachers should be encouraged to seek the assistance of other teachers whom with they can communicate on a daily basis and trust.

Mentors should be taught the needs, problems and stages of development of beginning teachers. Mentors should be trained in observation and conferencing techniques but should never be required to formally evaluate the performance of

beginning teachers because it could negatively effect the mentoring relationship.

Local administrators should guarantee mentors and beginning teachers released time, perhaps one period each day for communication, observation and sharing. Departments should make every attempt not to over-formalize the mentor-induction program as mentoring is an informal and naturally occurring process. Every effort should be made to continue the mentor-induction program beyond the first year of teaching.

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MENTOR TEACHERS' PERCEPTIONS OF THE MENTORING EXPERIENCE

A Critique

Barbara Malpiedi Kirby, North Carolina State University -- Discussant

The author did an excellent job of educating the reader about the mentoring process from a concise, but yet thorough review of literature. James, one of the authors cited, has become well known for mentoring research. While other researchers might have been cited in the larger study from which this paper came, I believe the author would be interested in research conducted by Thies-Sprinthall focusing on the induction and mentoring processes. Also, Joyce's model of adult development could be important to establishing a theoretical base for the profession in this research area.

The purpose and research questions for the study were clearly stated. The author is to be commended for using qualitative research procedures to investigate the problem. Since few individuals in our profession use this procedure, it would be helpful to the reader and necessary, as it is in other research procedures, to explain how the validity and reliability of the instrumentation were established. Training of the interviewer to question consistently is important to this type of study. Appropriately, the researcher noted that the findings were validated through rational discourse, inter-subjective agreement and joint depth of understanding. The participants consisted of nine in-school and nine subject matter mentors. Clarification is needed as to how the Posttest Only Control Group Design is used. I understand that this is more than a single case study because there are several dependent variables of a complex nature (Cook & Campbell, 1979). Assuming that the treatment was the mentoring experience, was there a group, other than mentors, involved in the study?

The author reported a comprehensive synthesis of the results. He addressed each research question of the study and helped the reader interpret the participants' perceptions and concerns. The use of direct quotes was helpful in clearly revealing their experiences. The information about benefits as well as the barriers to using subject matter verses in-school mentors was very interesting. The study supported the notion that mentors should not be administrators, especially those in an evaluative role. The time and training constraints were consistent findings supported by the literature.

I hope the author and others will consider the recommendations from this study as mentoring models are adopted throughout the profession. There are many possibilities for collaborative research as we study the mentoring process. The author might want to compare the strengths and weaknesses of the Minnesota model with those being studied in Virginia or North Carolina. The author is to be commended on writing a scholarly paper which greatly contributes to the knowledge base of our profession.

MENTORING: IS IT AN EFFECTIVE ORIENTATION PROCEDURE?

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INTRODUCTION

New employees hold the potential to become the new life and energy of any organization. Most organizations utilize some type of orientation program to assist new employees through the process of integration into the organization. Increasingly, organizations are seeing the benefit of "mentoring" as an integral part of an on-going personnel development program.

Lea and Liebowitz (1983) defined mentoring as an integrative process using behavioral terms. These terms focused on ten behaviors that mentors perform: teaching, guiding, advising, counseling, sponsoring, role modeling, validating, motivating, protecting, and communicating. Once a mentoring relationship has been initiated, the mentor provides the informal link between the protegee and organizational expectations.

Kaye (1983) linked successful mentoring relationships to employees who were relatively new to their jobs. Therefore, the success and impact of a mentor relationship weighs heavily on the mentor to provide an opportunity for growth of the protegee. The mentor must focus on "the student's strengths and interests" to guide the protegee through a sharing relationship (Lambert and Lambert, 1982, p. 12).

This sharing relationship results in benefits for the protegee, mentor and the organization. The protegee receives knowledge, personal support, protection and promotion while the mentor derives assistance on the job, information, loyalty and prestige. As a result of the mentoring relationship, the organization achieves managerial succession, managerial development, reduced turnover and increased productivity (Zey, 1984).

The Ohio Cooperative Extension Service (OCES) Mentoring System was developed as an informal supplement to the formal orientation activities provided during the agent's first year of employment. Prior to this mentoring system, new agents were provided formal orientation with only haphazard mentoring from "seasoned" faculty. In an effort to reduce turnover and increase productivity, the current mentoring system was instituted in January 1983. New agents were assigned mentors for the duration of their first year of employment.

To establish the mentoring system, all OCES agents were asked to identify three peers to be considered as mentors. Nominations were based on personality characteristics and subject matter skill. A point system was established in which nominations from peers outside of the named agent's geographic and program area received higher point values. This system allowed those agents with widespread recognition to be ranked higher than those whose reputation was limited to a specific geographic area or subject matter program. Those nominees with the highest point values were selected as

mentors. These mentors were then assigned to protegees based on geographic location, program area, and particular needs of the new agents (Smith and Beckley, 1985).

PURPOSE AND OBJECTIVES

The study was designed to analyze the success of the OCES Mentoring System as perceived by mentors and protegees. The study also sought to determine the future direction of the program. More specifically, the study was designed to examine the following characteristics and their relationship to the overall success of the program: number of meetings held per year; location of the meetings; hours spent together mentoring; individual responsible for the initiation of the relationship; content of meetings; degree of openness of communications; degree of awareness to social, economic, and political climate in the protegee's county; degree of understanding of the OCES; degree of increased subject-matter skills; degree of increased process skills; time commitment of the mentor; and the degree of professional influence provided by the mentor.

PROCEDURES AND DATA ANALYSIS

Data for the descriptive-correlational study were gathered using mail questionnaires developed by the researchers. The population for this study consisted of mentors (N=60) and protegees (N=60) in the OCES Mentoring System. Due to the small population size, a census was utilized. The study yielded a response totaling 58 of the 60 mentors (96.7 percent) and 57 of the 60 protegees (95 percent).

Reliability of the instruments was established using a test/retest procedure with faculty members of the Agricultural Education Department of The Ohio State University. These individuals were actively involved in faculty development mentoring relationships. Any items not receiving at least a 70 percent agreement between test/retest scores were rewritten before use with the study population. A panel of three experts, drawn from researchers and experts associated with the OCES were used to assess the instruments for content validity.

Data analysis utilized the SPSS statistical package. The level of significance was established a priori to be .05.

RESULTS

Demographics

The 20 female and 38 male mentors had an average age of 44. The mentors averaged eighteen years in Extension work and fourteen years in their present Extension position.

Protegees of the study consisted of 32 females and 25 males with an average age of 34. Their length of tenure at the time of this study consisted of an average of four years in Extension work and two years in their present Extension position.

Team Meetings

The mentor/protegee teams of the OCES Mentoring System met an average of three times. During the one year length of the program, Home Economist Mentors spent significantly more hours mentoring (23.76 hours) than Agricultural (13.86 hours) or 4-H Mentors (11.17 hours). The mentor county office or protegee county office was the location for the majority of these meetings.

Table 1

Analysis of Variance of Hours Spent Together Mentoring for Mentors

		Agriculture	4-H	Home Economics	
n:		29	12	17	
M:		<u>13.86</u>	<u>11.17</u>	<u>23.76</u>	
SD:		7.25	7.69	12.16	
Source	df	SS	MS	F	p*
Between Groups	2	1435.34	717.67	8.79	0.00
Within Groups	55	4488.17	81.60		
TOTAL	57	5923.51			

*p < .05

During the one year length of these mentoring relationships, mentor/protegee teams met an average of fifteen hours. As mentors and protegees spent more time mentoring, they felt the success of their mentoring experience increased ($r=.44$). The findings also indicated that mentors must be able and willing to commit the needed extra time to the relationship. Some of protegees commented that their mentors were either too busy or not interested in carrying out the relationship.

Once the mentor and protegee were paired by the OCES State Leader of Personnel Development, mentors were asked to make the initial contact with their assigned protegee. According to study results, over twenty-five percent of the relationships were initiated by the protegee. These protegees, who initiated contact with their mentors, reported a less successful mentoring experience when compared to protegees whose mentor made the original contact.

On a seven-point Likert-type scale, ranging from strongly disagree to strongly agree, mentors and protegees rated the communication atmosphere of the relationship slightly above "agree" (mentors = 6.5; protegees = 6.1). This score represented the degree of openness during interaction of mentor/protegee teams. Openness of the communication atmosphere entails the presence of a calm and relaxed interaction period between the mentor and protegee. Both teams believed this to be a key factor related to a successful mentoring experience in the OCES ($r = .54$).

The mentors and protegees were asked to list what they perceived as the five most important outcomes the protegee gained from the mentoring meetings. Mentors listed the following five outcomes as most important: 1) program planning ideas; 2) knowledge of Extension policy and procedures; 3) expertise from the mentor; 4) gained a friend; and 5) knowledge of available resources. The top four responses of the protegees were identical to those listed by the mentors. Specific advise in technical areas was the fifth item listed by protegees.

Table 2
Important Outcomes from Mentor/Protegee Meetings

Outcome	Mentor		Protegee	
	f	%	f	%
Program planning ideas	28	12.1	16	8.7
Knowledge of Extension policy and procedures	25	10.8	22	12.0
Expertise from the Mentor	22	9.5	26	14.1
Gained a friend	21	9.0	21	11.4
Knowledge of available resources	18	7.8	11	6.0
Release for ideas and frustrations	17	7.3	13	7.1
Specific advise in technical areas	16	6.9	16	8.7
Office policy and procedures	16	6.9	14	7.6
Time management	16	6.9	9	4.9

Overall Success

Over ninety percent of the mentors reported their mentoring experience as successful. Whereas, seventy percent of the protegees indicated success had resulted from their involvement in the program.

The dependent variable of perceived success was correlated with the characteristics of the study to indicate associations. Protegees indicated "Understanding of the Ohio Cooperative Extension Service" to be a contributing factor to the success of their mentoring experience ($r=.79$). They also reported openness of communication ($r=.64$), program planning skills ($r=.67$), hours of mentoring ($r=.45$), and the initiator of the relationship ($r=-.18$) as critical elements. The low negative correlation ($r=-.18$) for the variable of initiator of the relationships, while not statistically large, may have some very practical significance. The negative relationship shown in this correlation indicates that there is a tendency for the protegee to view the mentoring relationship as less successful if they are forced to make the original contact.

Mentors perceived success increased as protegee program planning skills ($r=.50$) and hours of mentoring increased ($r=.43$). Mentors also perceived the understanding of the OCES to be important to the success of the mentoring experience ($r = .39$).

Table 3

Relationships Among Selected Variables and the Overall Success
of the OCES Mentoring System

Variable	Levels of Success		
	Mentor n = 58	Protegee n = 57	Overall n = 115
Understanding of the OCES	.39	.79	.68
Openness of Communication	.18	.64	.54
Program Planning Skills	.50	.67	.62
Hours of Mentoring	.43	.45	.44
Initiator of Relationship	.12	-.18	-.06

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were based on the findings of this study:

1. Over ninety percent of the mentors felt their mentoring experiences were successful. Whereas, over seventy percent of the protegees reported the mentoring relationship to be successful.
2. Home Economist Mentors spent significantly more hours mentoring with their Protegees than Agriculture or 4-H Mentors. Mentors with the major program emphasis of agriculture reported the majority of their meetings were held at the mentor or protegee's county office. Mentors in Home Economics reported meeting at various locations. The use of various locations and having mentoring sessions after other work meetings may account for the increased hours spent by Home Economics mentors.
3. As mentors and protegees spent more hours mentoring, the perceived level of success of their mentoring experience increased.
4. The OCES Mentoring System recommended that mentors make the original contact with protegees to begin the mentoring process. However, over one fourth of the relationships were initiated by the protegees. When protegees were forced to make the original contact, negative feelings resulted concerning the success of the mentoring relationship.
5. The responses of the mentors and protegees relative to the five most important protegee outcomes of the mentoring relationship were very similar. The following five outcomes were listed by mentors and protegees as the most important: program planning ideas; knowledge of Extension policy and procedures; expertise from the mentor; friendship; and advice in technical areas (protegees) or knowledge of available resources (mentors)..
6. Mentors felt the communication atmosphere of the relationship was more open than reported by the protegees. However, both perceived success to be highly correlated with openness of communication.
7. As protegee understanding of the OCES increased as a result of the mentor/protegee relationship, their mentoring experiences were seen as more successful.

The following recommendations were based on the findings of this study:

- 1) Basic guidelines and training for members should be conducted prior to the mentoring relationship. Written comments from mentors indicated that organizational expectations were not always made clear. In addition to some basic guidelines, mentors need to understand those factors that lead to success. A brief training session related to creating open communication and basic personal communication would be beneficial. Also during the training session, the mentors should be counseled on the importance of making the

original contact with the protegee and the need to commit the necessary time to build a trusting relationship. In order to facilitate interaction between mentors and protegees, it would be advisable to locate mentors and protegees in as close a geographic location as possible.

2) Coordinators of a mentoring program must establish the mentoring relationship early in the protegee's employment. Comments from protegees indicated that mentoring relationships were less beneficial the later they occurred during the first year of employment.

3) Organizational expectations need to be realistic as to the type of information transferred during the mentoring relationship. The transfer of technical subject matter is of lesser importance than the establishment of friendships and an opportunity to exchange ideas and concerns. A vital component of the mentoring relationship is the opportunity to gain knowledge of the organization for which they work.

Findings of this study may have application to teachers and teacher-educators. Recent studies of high school, middle school, and elementary school teachers show similarities between agents and teachers in formal education settings. Teachers report that their career decisions have been influenced by mentors. They also believed finding a mentor was very important to a teaching career (Gehrke & Kay, 1984).

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MENTORING: IS IT AN EFFECTIVE ORIENTATION PROCEDURE ?

A Critique

Barbara Malpiedi Kirby, North Carolina State University -- Discussant

The mentoring concept is not limited in its application to secondary and post-secondary institutions. Nationally, the cooperative extension service has realized the need for the profession to provide greater assistance and support to its new members. Program evaluation is an important component of the extension service. Analyzing the strengths and weaknesses of the Ohio program provides the profession with evidence as to which factors are associated with successful mentors and mentoring programs.

The authors provided a very concise review of literature related to mentoring. A stronger theoretical base should be developed. Particularly, the work of James, Joyce, Thies-Sprinthall, Reiman, Camp and Heath-Camp have discussed and tested theories of adult development, supervision, relationship building, reflection, and the induction process. Granted, the majority of the studies focus on mentoring in the public schools. However, basic principles consistently surface that should help others test the mentoring theory in their own profession.

A clear definition of the problem led the reader to a succinctly stated purpose and the appropriate objectives. The authors described their research procedures, including how they determined the validity and reliability of the instrumentation. It would be helpful to those who wish to replicate the study if the researchers would identify any follow-up procedures used for the non-respondents and address non-response error.

For the most part, appropriate statistics were used in the analysis of a census study group. It seemed to me that a paragraph was missing that described the statistical analysis. The researchers needed to indicate if in fact they used Pearson r and which conventions they used to interpret the strength of the reported relationships. There is a need for additional clarification of the various measurement scales and variables used. Displaying the results in tables was helpful. An analysis of variance was not necessary. Clearly there were differences in the mean number of hours. If an ANOVA was important to the authors, then they needed to refer to it and explain it in the text. I must also caution the researchers to be careful in their textual discussion not to conclude that the correlation coefficients represent critical factors or causal effects.

It was of interest and not surprising to find that increases in time was associated with strengthening mentoring relations and that time was also a barrier to the process. Several mentors found it difficult to have enough time to be helpful. This study also confirmed the principle that relation building, including initiating the relationship, is an important component in the process. Several conclusions restated the results of the study. The recommendations were clearly based on the results of the study.

The authors have contributed to our knowledge base in agricultural education. Several procedural and clarification items have been mentioned in an attempt to help the authors strengthen the paper for publication. They are to be commended for analyzing an existing program and for making timely recommendations for improving the mentoring program in the Ohio Cooperative Extension Service.

A MODEL FOR SCHEDULING PRACTICES AND PROCEDURES ASSOCIATED WITH AGRICULTURAL EDUCATION IN THE NEW YORK PUBLIC SCHOOL SYSTEM

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INTRODUCTION

The 1985 New York State Regents Action Plan significantly increased graduation requirements, thereby leaving little room to schedule elective courses such as agricultural education.¹ This situation supports fears of Buzzel (1987), executive director of the American Vocational Association, concerning the philosophical shift of emphasis to academics in secondary education, which results in limited access to occupational education. Policies and procedures practiced by guidance counselors, administrators, and agriculture teachers to schedule agricultural education will have a direct impact on the future of the program and accessibility to it.

The Unfinished Agenda published by the National Center for Research in Vocational Education called for new innovative scheduling strategies to enhance access to vocational programs.² To properly plan scheduling strategies requires an understanding of current scheduling practices and the consequences of them in terms of student access to agricultural instruction.

To address the issue of scheduling agricultural education programs, a conceptual base was taken from an economic production model (Becker, 1965) and adapted to study occupational education.³ In this model, scheduling is part of the school governance system and one of the means by which educational services-agricultural education in this case-are provided. This study explores the multiple dimensions of scheduling and addresses the problem of scheduling students into occupational and agricultural education in the New York State public school system.

PURPOSE AND OBJECTIVES

The primary purpose of this research was to provide information to those who develop scheduling policies and procedures for local schools and occupational centers titled Boards of Cooperative Educational Services (BOCES) in New York State. Additionally, the study sought to develop conceptual understandings of the scheduling phenomenon that could lead to greater student access to agricultural education and other occupational courses. The research objectives were

1. Determine the extent that practices associated with scheduling agricultural education are used currently and will be used in the future
2. Compare the perceptions of agriculture teachers, administrators, and counselors on the impact of new Regents' mandates on scheduling agricultural units
3. Identify and describe factors affecting scheduling of agricultural and other occupational education

4. Determine and compare the perceptions of agriculture teachers, administrators and counselors on new scheduling practices for the future

PROCEDURES

This one-shot case study⁴ used questionnaires and personal interviews to obtain perceptions from administrators, counselors, and agriculture teachers pertaining to scheduling for agricultural education. A representative sample of tenth grade students completed a questionnaire.

The population of 220 schools and BOCES listed by the state education department that offer agricultural education was stratified by the number of agriculture teachers (single or multiple), size of schools (five levels), number of state curriculum update workshops attended by the agricultural teacher (two levels), and geographical location of agricultural programs in the state (four areas). Then, a stratified random sample of 21 local schools and 8 BOCES was selected, controlling for frame and selection errors. A research investigator was trained to collect data during a one-day visit to each school site. Educators were interviewed and the questionnaires administered during the visits. Tenth grade students completed questionnaires.

Questionnaires and interview schedules for agriculture teachers, administrators, guidance counselors, and tenth grade students were developed from a review of related literature and in consultation with a panel of experts. A separate panel of experts determined that the instruments were content valid. The instruments were field tested in three schools and a BOCES to establish reliability for likert scale subsections of the questionnaires. Cronbach Alpha reliability coefficients ranged from .78 to .94 for subsections of the instrument.

All agriculture teachers (n=29), administrators (n=28), and guidance counselors (n=29) at each of the 29 sites completed the research instrument and were interviewed, with the exception of one administrator in a school that dropped the agricultural program soon after data were collected. A random sample of 789 tenth grade students responded to a questionnaire. Sample size was proportional to the number of tenth grade students in the school. Sampling procedures for both educators and students controlled for sampling error.

DATA ANALYSIS

Data from the written questionnaires were coded and analyzed using SPSS-X on the mainframe computer and microcomputer. Both descriptive and inferential statistics were used to analyze the data. A modified Q-sort procedure was used to analyze the qualitative aspect of the research from the transcribed interviews.

RESULTS

The findings are based on both quantitative and qualitative data collected in this study. Comments by respondents are given to illustrate concepts or factors described from the data.

SCHEDULING PRACTICES

Guidance counselors rated both their use of three scheduling procedures and plans to use them in the future on a scale from 1 (none) to 4 (always). Agriculture teachers also rated their use of one item—prescheduling conferences. The results are shown in table 1.

The extent guidance counselors have used and plan to use manual ($\bar{m}=2.69$) and computer scheduling ($\bar{m}=2.86$) was not significantly different at the .05 level. In the future, guidance counselors plan to computerize scheduling ($\bar{m}=3.07$) much more frequently than to schedule students manually ($\bar{m}=1.93$). Guidance counselors often ($\bar{m}=3.46$) have prescheduling conferences with students and will increase this practice in the future ($\bar{m}=3.62$). Agricultural teachers often ($\bar{m}=2.75$) counsel students before they preregister for the next year, but less frequently than guidance counselors. In the future, agriculture teachers ($\bar{m}=3.03$) will have prescheduling conferences with students more frequently than in the past, but less than guidance counselors ($\bar{m}=3.62$).

Table 1

Mean and Standard Deviation of Current and Future Use of Selected Practices by Guidance Counselors

Guidance Practices		<u>Counselor</u>		<u>Agriculture Teacher</u>	
		<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Computer scheduling	P	2.86	1.21	—	—
	F	3.07	1.33	—	—
Manual scheduling	P	2.69	1.28	—	—
	F	1.93	1.36	—	—
Prescheduling conferences	P	3.46	0.96	2.75	0.96
	F	3.62	0.68	3.03	0.82

Note: Agriculture teachers did not respond to items on computer and manual scheduling. Scale: none=1, low=2, often=3, always=4; P=past and F=future.

IMPACT OF NEW REGENTS' MANDATES ON SCHEDULING OCCUPATIONAL EDUCATION

The impact of selected factors associated with scheduling occupational education under the new Regents' mandates was described quantitatively (responses to likert scales 1-strongly disagree to 4-strongly agree) and qualitatively (from interview data). According to respondents, the Regents' proposal will limit access to occupational education. Agriculture teachers ($\bar{m}=3.44$) perceive the impact more strongly ($p<.05$) than guidance counselors ($\bar{m}=2.8$) and administrators ($\bar{m}=2.9$).

Enrollment declines in agricultural education and other occupational classes were predicted by almost all respondents as new graduation mandates reach full implementation. The following comments are typical of the concerns expressed.

Teacher: There is no way that our freshman can take all the requirements and schedule occupational courses.

Administrator: We are going to let the Regents' plan wipe out occupational education.

Honors students, in comparison with local diploma students, are severely limited when scheduling occupational classes and agricultural education courses. The impact is worse when these students have extracurricular activities. Guidance counselors, administrators, and agriculture teachers expressed their sentiments.

Administrator: We have students with agricultural backgrounds who will go to college to study agriculture, yet cannot schedule it, or will be limited to one course in agriculture. This is sad.

Teacher: If Regents students have any extracurricular activities, band or chorus, they will not be able to take occupational courses.

Limited access to occupational education for Regents students is particularly acute in small rural schools. Scheduling conflicts are more prevalent in the smaller schools because there are fewer sections of courses and less options for students to adjust their schedules.

Counselor: Because we are a small school, Regents students may not be able to enroll in agriculture or other occupational courses.

Teacher: In a school this size, students could easily find chemistry, a business course, and agriculture scheduled at the same time without an option to schedule the courses another time.

Schools that have informal occupational credit options such as youth leadership and occupational experience seem to have fewer problems scheduling students in an occupational sequence. It is also less difficult to schedule occupational education at home schools or BOCES during a nine-period day than in schools with fewer periods. As the number of periods diminishes from nine, the difficulties with scheduling become more severe, even critical when there are six periods or less. For example, an administrator in a school with nine class periods noted few problems scheduling agricultural education.

Administrator: There isn't any problem in this school for Regents students to take an agricultural sequence if they remain in the school for four years.

FACTORS AFFECTING SCHEDULING FOR AGRICULTURAL EDUCATION

Among tenth grade students, 18.2% planned to enroll in agriculture or another occupational class in 1988-1989, 61% encountered barriers to scheduling these courses and 20% had time in their schedules to enroll but chose not to. Only 14.3% of the tenth grade class in BOCES (technical centers) felt they had sufficient time to schedule an agricultural course in 1988-1989.

Factors affecting scheduling for agricultural and other occupational courses at BOCES and local schools were the number of class periods in the school day, the number of class periods that an occupational class occupies, graduation

requirements, scheduling conflicts with other vocational courses, foreign language requirements, and the level of rigidity of scheduling policies and procedures.

Barriers for scheduling occupational courses unique to the technical centers are BOCES feeder schools that vary in the number of scheduled periods, limited opportunity to experiment because changes disrupt schools served by the BOCES, lack of cooperation between local schools and technical centers, and declining enrollments in local school. Other factors are limited time to schedule elective courses, increased academic requirements, a decreased student base, and travel time to BOCES.

Regents'honors students have insurmountable problems when they try to attend BOCES, according to most of the administrators, guidance counselors, and agricultural teachers in this study. Local diploma students who have remedial work and/or have to repeat a course also face significant obstacles. Most educators believe that enrollments in BOCES will decline further and are concerned that students who need occupational skills when they graduate will drop out or be denied access to BOCES. They are also concerned that students will have a limited high school foundation for postsecondary technical education, and some will not have the positive experiences to motivate them to attend these colleges.

NEW SCHEDULING PRACTICES FOR AGRICULTURAL EDUCATION

Agriculture teachers, administrators, and guidance counselors indicated the extent three scheduling practices are needed to implement the new agricultural education curriculum (table 2). Their ratings were based on a scale of 1-none, 2-low, 3-moderate and 4-high.

Guidance counselors ($\bar{m}$ =2.48) and administrators ($\bar{m}$ =2.68) perceived a moderate to high need to adjust current scheduling procedures in their schools. Conversely, agriculture teachers ($\bar{m}$ =3.58) felt a significantly higher ($p<.05$) need to make adjustments than other educators in the sample. All three groups of educators indicated a moderate to high need for the agriculture teacher to input into scheduling procedures. Agriculture teachers rated this item 3.48, significantly higher ($p<.05$) than administrators.

Administrators and guidance counselors felt low need to revise criteria to select students to study agriculture. Agriculture teachers perceived a moderate need ($\bar{m}$ =2.97), which was significantly higher ($p<.05$) than the other two groups.

Many schools have increased the number of class periods and/or scheduled selected courses before or after the regular school day so students can meet graduation requirements. Variations of this approach are lengthen the school day, add class periods, secure waivers for some students, go to an eight- or nine-period day, take band or chorus before the school day starts, go to a ten-period day on a six-day cycle, and shorten class periods.

Some schools that use innovative strategies greatly improve their students' chances of scheduling agricultural education.

Administrator: Because we are on a nine-period day, students can take agriculture.

Administrator: Because students start foreign language in eighth grade and we have a nine-period day, I believe our students can enroll in agriculture.

Strategies for scheduling occupational education at BOCES are similar to those used in home schools, such as lengthening the school day, using shorter class periods, and increasing the number of periods. Other strategies are unique to BOCES such as students studying full days at the technical center, adjusting BOCES opening and closing hours, and teaching BOCES courses in home schools. All these strategies require the cooperation of central schools in the BOCES district. Suggestions by respondents show the ideas that educators have about BOCES schedules: open BOCES later so students can get in an additional period at the home school before attending BOCES, schedule both academic and vocational courses at BOCES, increase cooperative planning between local schools and BOCES, reduce the time committed to occupational classes, offer occupational units in local schools sponsored by BOCES, and schedule an occupational education sequence at BOCES all day for a year.

Administrators and guidance counselors at BOCES are eager to meet and plan with educators in component schools for occupational sequences and to provide students maximum access to their occupational programs. In some BOCES districts, all guidance counselors and administrators in the system meet each month to plan educational programs. In other districts, strategies for planning BOCES schedules could be improved.

Table 2

Mean and Standard Deviation of New Scheduling Practices Needed to Implement the New Agriculture Curriculum

	Guidance		Agriculture Teachers		Administrator	
	M	SD	M	SD	M	SD
Adjust scheduling procedures *	2.48	.872	3.58	.62	2.68	.983
Input from agriculture teacher **	2.96	.84	3.48	.72	2.81	.833
Revise criteria to select agriculture students	2.88	.925	2.97	.752	2.32	.819

Note: Scale: none=1, low=2, moderate=3, high=4.

* $p < .05$ significant for agriculture teachers and both administrators and counselors

** $p < .05$ significant for agriculture teachers and administrators

A model for scheduling agricultural and occupational education should be based at both the local and state levels. New graduation mandates, factors affecting scheduling, and the identification of new scheduling initiatives should be planned cooperatively by educators and administrators for local schools and

BOCES. Experiences at these local levels provide important information for revision and further development of state guidelines pertaining to scheduling.

CONCLUSIONS AND RECOMMENDATIONS

1. Scheduling practices in central schools and BOCES include increased computerized scheduling, less manual scheduling, and more prescheduling conferences with students. Agriculture teachers occasionally counsel prospective students. Agriculture teachers, administrators, and guidance counselors sometimes disagree on the scheduling practices that should be used in their schools.
2. New Regents' mandates have diminished the opportunities students have to schedule agricultural education and other occupational units, particularly students in honors, small rural schools (which have single section classes), schools with six or fewer class periods, schools that do not have flexible arrangements and informal study options in occupational education, and for students who wish to attend BOCES. Occupational education is easier to schedule in central schools.
3. Agriculture teachers feel more strongly ($p < .05$) than administrators and guidance counselors that new mandates have limited access to agricultural education and other occupational programs.
4. Barriers that students encounter when scheduling occupational courses are primarily linked with increased academic requirements. Students face scheduling conflicts with both required and elective courses, foreign language requirements, occupational units that require multiple class periods to complete; sometimes need remedial assistance; may have to make up a failed course, and generally cannot meet increased academic requirements and schedule occupational education.
5. To schedule students at BOCES in agricultural and occupational education is more difficult under the new Regents' mandates because the school schedule is more compressed, time is required to travel to BOCES, BOCES units occupy two or more class periods, local school schedules vary making it difficult to plan and to experiment with new models for scheduling, and some local schools limit students' access to BOCES. Some scheduling problems seem insurmountable, whereas others are temporary.
6. Educators believe that scheduling procedures, input from the agriculture teacher and criteria for selecting students to study agriculture are needed to improve scheduling options for students. Agriculture teachers support these endeavors more than guidance counselors and administrators.
7. Strategies to increase the opportunity that students have to schedule agricultural and other occupational units in local schools are to increase the number of class periods in the school day, shorten class period length to the minimum allowed, adopt a revolving period day on a several-day cycle, schedule selected units before and after school (i.e., band and chorus), drop the language requirement or move it to elementary and junior high school, and provide informal options for credit in agricultural education (i.e., leadership development through FFA and occupational experience through arranged units).

8. Strategies to increase student access to agricultural and occupational education at BOCES are to offer a full-day schedule at BOCES, teach Introduction to Occupations, Occupationally Related Math and Science and other popular courses at BOCES, integrate selected units into occupational units at BOCES, plan cooperatively with each component school, reduce the time committed to an occupational class at BOCES, offer occupational sequences in home schools sponsored by BOCES, offer a one-year or all-day sequence at BOCES, and start BOCES at 9:00 A.M. (other adjusted time) to provide an additional class period at home schools.

9. Agriculture teachers, other occupational teachers and the school administration at BOCES and in local schools should plan cooperatively with school officials to minimize scheduling problems and to provide counselors with relevant input variables for computer scheduling. Prescheduling conferences for prospective students, assisting their students with scheduling problems and offering informal study options through FFA and occupational experience are examples of how teachers can assist with scheduling.

10. Local educators and state education department officials should monitor scheduling problems for occupational programs caused by new requirements, take steps to resolve the problems, and inform the Regents of scheduling problems that cannot be resolved, so they can take action.

11. According to respondents in this study, the foreign language requirement should be rescinded, modified, or moved to earlier grade levels so students can schedule occupational education and other electives in high school.

NOTES

1. See C. Pipho, States move reform closer to reality, *PDK Magazine* (December 1986): k1-k8 for a detailed description of reform effects by state and a general discussion on a national basis.

2. See National Center for Research in Vocational Education, *The unfinished agenda - The role of vocational education in the high school* (Columbus, OH: National Center Commission on Secondary Vocational Education, Undated).

3. See D. Sutphin, *A conceptual framework for inquiry about student access to vocational education applied to a conceptual analysis about the impact of enrollment decline* (Paper presented at the American Education Research Association, Washington, DC, 1987) for a description of the complete model.

4. See D. Sutphin, *A model to analyze the current status and determine future projections for agricultural education in New York State* (Ithaca, NY: Cornell University, 1988) for a more detailed description of the research process for this study.

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A MODEL FOR SCHEDULING PRACTICES AND PROCEDURES ASSOCIATED WITH
AGRICULTURAL EDUCATION IN THE NEW YORK PUBLIC SCHOOL SYSTEM

A Critique

Bob R. Stewart, University of Missouri-Columbia--Discussant

The author has undertaken a study of a problem of significance related to the delivery of secondary agricultural education. He is to be complimented for tackling a difficult but important issue.

A review of the paper would indicate a focused but very brief review of literature that ended with a precise definition of the problem, followed by a statement of specific purposes. The theoretical base for the study could be strengthened. The procedures section was helpful, detailing the selection of the population and describing appropriate checks on reliability and validity of the instrument. However, more precise information about the selection of the sample of tenth grade students would have been helpful. In addition, more information about the questionnaire and a description of the specific inferential statistics used would strengthen the procedures section.

The paper presents a helpful and careful presentation and discussion of the data. The conclusions and recommendations are well stated. However, the conclusions appear to go beyond the data presented in this paper but which no doubt are available in a larger study. For the integrity of this paper, the conclusions should be carefully edited to reflect the information presented in the findings of this paper.

Again, the author is to be commended for reporting on a subject important to agricultural education.

A NATIONAL STUDY TO DETERMINE THE ROLE OF
BIOSCIENCE/BIOTECHNOLOGY IN THE STUDY OF AGRICULTURE
AS PERCEIVED BY VOCATIONAL AGRICULTURE INSTRUCTORS

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INTRODUCTION

One of the new methods of agricultural production is the application of biotechnology in agriculture. Biotechnology is a buzz word commonly heard in conversation today, but seldom understood beyond the realm of science. Yet biotechnology is being called agriculture's third wave, comparing it to machines replacing human labor and chemicals being introduced into agricultural production (Lasley, 1987). Biotechnology with all its inherent complexities, mysteries, problems, and challenges, promises to revolutionize farming and agriculture. In addition, it is expected to become the major source of innovation for agriculture by the early 21st century. One recent survey of knowledgeable representatives of the farming, industrial, government, and academic sectors projected that biotechnology will account for forty percent of the innovations for crop production by the year 2005 (Hardy, 1985). According to Stansbury and Coulter (1986), agriculture affords dynamic and exciting career opportunities with domestic and international dimensions for students of vocational agriculture. A study conducted by the United States Department of Agriculture during 1986 revealed that of the 49,000 annual employment opportunities for college graduates in the food and agricultural sciences, 28 percent of the career opportunities are for scientists, engineers, and technicians.

It is evident from the above statements that students of agriculture must learn the sciences related to agriculture. Biosciences such as plant science, animal science, genetics, microbiology, soil science, and food science provide the foundation for the growth and development of the industry of agriculture.

The application of biotechnology must be shared with students of agriculture in order to educate them regarding the occupations available in the field. The study of the biosciences paves the way for thorough preparation of students by laying down a strong foundation in the principles and concepts of science over which a super structure of agricultural biotechnology can be built in the years to come. It would be very difficult for students to understand the application of biotechnology unless they were thoroughly prepared in the fundamentals. For instance, increasing the production of animals through the use of genetics cannot be understood unless students have some basic knowledge about cell functions and make-up in animals (Martin, 1987).

However, one might find it very difficult to proceed further in this direction without an adequate knowledge of what is happening in the field. Although sciences pertinent to agriculture are being taught, we do not know to what extent they are being taught nor do we know the gap between what is being taught and what more should be taught related to the sciences of agriculture. In addition, certain interesting questions raised by Smith (1989, p. 10), supported the purpose to which this study was intended:

Many educators question what needs to be taught in the sciences related to agriculture. How much science should be taught in vocational agriculture programs? Is biotechnology likely to have an impact that would warrant a specialized curriculum effort? Should information on biotechnology be integrated into all aspects of the agriculture curricula?

PURPOSE AND OBJECTIVES

The purpose of the study was to identify perceptions held by teachers of agriculture in the USA regarding the infusion of the biosciences into the study of agriculture. The study also sought to measure the degree of acceptance which could be expected on the part of the teachers as further efforts are implemented to infuse the biosciences into vocational agriculture programs across the nation.

The specific objectives of this study were:

1. To identify the level of importance of the biosciences as perceived by vocational agriculture instructors in the USA.
2. To determine the degree to which instruction in the biosciences would be increased by vocational agriculture instructors in the USA given selected instructional materials and inservice education.
3. To determine perceptions held by vocational agriculture instructors regarding teaching the biosciences.
4. To compare the various groups of respondents regarding their perceptions of selected bioscience competencies and demographic factors.

PROCEDURES

The research approach used in this study was a descriptive survey method. This method has been validated as a means of gathering information for studying the attitudes and perceptions of people. The responses for a perception study can be measured quantitatively using scales. The information gathered must be analyzed to assess interrelationships between variables and the principle of random sampling must be observed (Web, 1985). This study was national in scope. Vocational agriculture instructors from all fifty states were included in the population. The target population for the study was 10,102 vocational agriculture instructors in the USA. The vocational agriculture instructors were identified from the Agriculture Teachers Directory for the year 1987 published by the National Vocational Agriculture Teachers Association of the USA.

An adequate sample size for this study was determined to be five percent (5%) of the population (Seshan, 1979). A proportionate stratified random sampling method was adopted in order to select the sample (Seshan, 1979).

To ensure that the sample was representative of all groups, the population was stratified into six groups based on the six regions of the National Vocational Agriculture Teachers Association (NVATA) of the country (Agriculture Teacher Directory, 1987). A proportionate sample of five percent was drawn from each group (region) based on the number of active vocational agriculture instructors in the country.

The instrument used in this study was primarily designed to identify the level of importance of the bioscience competencies and the extent to which instructors would increase instruction in these competencies given selected resources and inservice education. The instrument also contained questions to determine perceptions held by vocational agriculture instructors regarding teaching the biosciences.

The following steps were adopted in order to develop the instrument used in the collection of data for this study: A list of bioscience knowledge and skills was compiled based on the topic areas and the curriculum guide developed by the Iowa Technical Committee on Biotechnology, knowledge obtained through discussions with the committee, related literature and experience of the investigators. These statements were developed in six broad categories of the biosciences, namely: 1) plant science, 2) genetics, 3) animal science, 4) microbiology, 5) soil science, and 6) food science. The compilation of the knowledge and skill statements was done utilizing these criteria: a) Knowledge and skills directly contributed to the applied sciences, b) Knowledge and skills have a direct impact on student career opportunities, c) Knowledge and skills have a relationship to the seven occupational areas of the agricultural industry, d) Knowledge and skills reviewed and approved by a panel of experts.

A Likert-type scale with points ranging from 1 to 5 was used to collect information regarding teacher perceptions in the following areas: a) Extent to which this knowledge or skill area was important, b) Extent to which the instructor would increase instruction in this knowledge or skill area given instructional materials and inservice education. Nineteen statements to determine perceptions held by vocational agriculture instructors regarding teaching the biosciences were framed. Questions pertaining to the respondents' demographic information were asked in order to gain knowledge of the participants of this study.

An expert committee, represented by the members of the Iowa Technical Committee on Biotechnology and selected vocational agriculture instructors reviewed the questionnaire for content validity. The final draft of the questionnaire was pilot-tested with a group of vocational agriculture instructors who were not members of any sample strata.

The questionnaires were mailed to the 505 vocational agriculture instructors. A composite reliability coefficient for the instrument was computed using Cronbach's alpha (.80).

The response rate for the mailed questionnaire was 47.0% (n=237). Non-respondent follow-up procedures with five percent of the non-respondents yielded no significant differences between respondents and non-respondents.

ANALYSIS OF DATA

Statistical analysis included the use of frequencies, means and standard deviations to determine the level of importance of the bioscience knowledge and skills and the degree to which instructors would increase instruction in these areas. A one-factor analysis of variance was computed in order to compare the six regions regarding the level of importance of the knowledge and skills and the degree to which instruction would be increased. The Tukey method was used as a post-hoc analysis to identify where the differences existed among the regions. To test for relationships between selected demographic factors and perceptions, the Pearson correlation coefficient was used at the .05 level of significance.

RESULTS

The average age of the respondents was found to be 44.4 years. Among the respondents, 47.3 percent possessed a bachelor of science degree while 52.7 percent had earned a master of science degree. The average years of teaching experience of the respondents was 14.7 years. Acceptance of biotechnology and bioscience emphasis in agricultural education was positively correlated with the age of respondents. The older the instructor the more likely he/she agreed that a study of the biosciences would help students better understand agriculture. There were no other significant correlations between the demographic data and the perceptions held by respondents.

One of the objectives of this study was to determine the perceptions of vocational agriculture instructors regarding teaching the biosciences. Overall, the agriculture instructors agreed learning the biosciences would help students understand agriculture ($x=4.53$, $SD=.63$). This finding indicated that the instructors were aware of the fact that the study of agriculture needs basic knowledge of the biosciences.

The agriculture instructors also agreed that students should learn how to explain the processes that occur in plants and animals while studying agriculture ($x=4.33$, $SD=.66$).

The concept that infusion of more of the biosciences would expose students to diversified career opportunities in the field of biotechnology was supported ($x=4.26$, $SD=.79$).

The instructors agreed that learning about the biosciences would help students in developing skills in related agriculture fields ($x=4.12$, $SD=.77$).

There exists a perception among some agriculture instructors that vocational agriculture students are not very interested in learning the biosciences related to agriculture. This finding might be attributed to the fact that the instructors were concerned that too much focus on the sciences of agriculture may hurt enrollment instead of enhance enrollment in agriculture programs.

The instructors moderately agreed that they were interested in infusing bioscience skills and knowledge into the study of agriculture ($x=4.31$, $SD=.68$).

The need for additional instructional materials for teaching the biosciences was recognized when the respondents ranked this item as the first among all perception statements ($x=4.55$, $SD=.77$).

The following finding created an ambiguity as to whether the instructors would proceed to infuse the biosciences even though sufficient instructional materials would be made available to them. The agriculture instructors agreed with the statement that it would take additional time to incorporate the biosciences into the study of agriculture ($x=4.27$, $SD=.95$).

It was observed that at least some vocational agriculture instructors seemed "some what" neutral in their belief that study of the biosciences would help in developing SOE programs ($x=3.73$, $SD=.91$).

Some agriculture instructors perceived that the infusion of the biosciences would not strengthen FFA activities. In other words, some teachers disagreed, to some extent, with the statement "infusion of the biosciences into vocational agriculture would strengthen FFA activities ($x=3.62$, $SD=.97$)".

Instructors disagreed that biotechnology would promote chemical dependency ($x=2.53$, $SD=1.02$). The agriculture instructors also agreed with the view that biotechnology will be useful for improving disease and insect resistant plant varieties ($x=4.42$, $SD=.70$) and that biotechnology would help breeders to improve nutrient value of food and feed grains ($x=4.38$, $SD=.65$).

Another objective of this study was to determine the level of importance of the bioscience competencies in the study of agriculture. It was found out that most of the competencies related to the plant sciences were of high importance (on a scale of 1 to 5, 5=highly important, 1=not important). Plant sciences that are related to production agriculture were also given high importance. Competencies that dealt with plant classification and certain new technologies such as hydroponics received moderate to low importance. This finding indicates that most of the competencies related to plant sciences were important to agriculture instructors.

Among the competencies in the areas of genetics, the agriculture instructors gave higher importance to competencies related to plant breeding where as the competencies related to cell biology were rated low in importance. The competencies related to the category biotechnology were rated moderate in importance.

Among the animal science competencies, the competencies related to livestock production were given high importance in vocational agriculture programs. The competencies related to the categories "animal systems" and "technology for growth" were given lower importance.

In the microbiology competency area, it was observed that none of the items were given a high importance rating. This information suggests that a lack of adequate laboratory facilities, unavailability of a compound microscope and lack of instructional materials might be the reasons for lack of instruction in this competency area. The area of food science also received a low importance

rating. It appeared that the production nature of vocational agriculture programs and the instructors being unaware of the vast career scope in the field of food preparation and processing might have contributed to the lack of attention in this area.

Another objective addressed by this study was to determine the degree to which vocational agriculture instructors would increase instruction in the biosciences given selected resources and inservice education.

Among the plant science competencies, the knowledge and skill areas that deal with principles of plant physiology and plant growth and development were rated high. The competencies related to the category "plant classification" were rated low.

The instructors seemed interested in increasing instruction in the area of genetics and to some extent in biotechnology. At the same time, the instructors did not perceive expanding instruction in the category of "cell biology." This finding indicates that the instructors were unaware of the fact that the understanding of cell biology is essential for learning biotechnology.

Among the animal science competencies, those competencies related to the category "technology for growth" were given high priority for expansion of instruction.

The high mean scores for expansion of competencies related to methods of maintaining water quality were not very surprising as this topic is becoming more and more of a priority at the national level in general and the midwest in particular.

It was observed that the agriculture instructors gave low importance to expanding instruction relating to the category "structure and function of microorganisms" though they perceived that there should be instruction related to the category "role of microorganisms in agriculture." It appeared that the instructors did not have a clear understanding of the structural nature of microorganisms such as yeast, fungi, and bacteria.

The food science competencies related to food processing, fermentation and new food products received the attention of the agriculture instructors by indicating a need for expansion of instruction in those areas.

The competencies related to microbial processes that take place in the preparation of food received the lowest rating by the instructors.

The final objective addressed by this study was to compare various groups of respondents regarding their perceptions on selected competencies and demographic factors. Significant differences among the NVATA Regions I, II, V, and VI were observed regarding expansion of instruction in the areas of plant science, genetics, microbiology, and food science. In other words, the mean scores in regions I and II for expansion of instruction in the above-named competency areas were significantly less than regions V and VI. In the soil science competency area, the mean scores for soil science competencies in regions II and III were significantly higher than regions IV and VI. No significant differences in the animal science area were observed.

The vocational agriculture instructors in Region I were not very positive towards the survey. One of their major concerns was that the vocational agriculture program may weaken the objectives of vocational education if the instructors get so heavily involved with the biosciences. Most of the comments from the agriculture instructors of Region II were favorable to the infusion of the biosciences into the study of agriculture.

Though some instructors argued that they could not provide instruction in the biosciences without relevant materials, Region III instructors strongly felt that certain changes in agricultural education were a must.

The instructors of Region V had a desire to expand instruction in the biosciences. This effort however, has these limitations: need for instructional materials suited to the needs of their students and local community, conflicts with science department, and lack of hands-on experiences in the biosciences. The instructors in Region VI were very much interested in infusing the biosciences into the study of agriculture though they expressed their concern regarding additional costs.

CONCLUSIONS

The following conclusions were made regarding this study:

1. The results of this study indicate that some instructors had doubts regarding student involvement in a program of vocational agriculture which focuses on the biosciences.
2. Some instructors had somewhat of a neutral view of the role of the biosciences in diversifying career opportunities for students, the bioscience related SOE programs and strengthening FFA activities.
3. It was clear that additional instructional materials were needed to expand instruction in agriculture to include more emphasis on science and this need was felt throughout the country.
4. The instructors' perceptions of the bioscience competencies were to some extent contradictory to their perceptions regarding teaching the biosciences in agriculture.
5. The information regarding the importance of the biosciences and the need for more materials indicated an interest in infusing the biosciences into the curriculum.
6. Instructors indicated that they would especially like to expand instruction in the following: plant growth and development, technology regarding animal growth, soil problems and ground water quality, food products and processing.
7. Some instructors were not enthusiastic about expansion of instruction in areas like animal systems, cell biology, nature and properties of soil, structure and function of microorganisms and the microbial process in foods.

RECOMMENDATIONS

The following recommendations were made based on the findings of this study and the review of literature:

1. A link should be established among biotechnology industries, agricultural educators, and teachers. This linkage would help develop

- job related skills for students of vocational agriculture. This effort would also result in getting funds for equipment related to biotechnology.
2. Instructional materials should be developed that focus on the biosciences and their impact on agriculture.
 3. Agricultural educators should develop state advisory committees to design a model instructional program focused on the sciences in agriculture.
 4. Inservice training programs should be conducted for teachers to expand their agriscience knowledge and use of innovative approaches to teaching.
 5. School policies should be set which allow science credit to be granted to selected agriculture courses which present students with the principles of science.
 6. Teachers should explore science-related supervised occupational experience programs and FFA programs involving biotechnology industries thereby improving the image of the vocational agriculture program.

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A NATIONAL STUDY TO DETERMINE THE ROLE OF BIOSCIENCE/BIOTECHNOLOGY IN THE
STUDY OF AGRICULTURE AS PERCEIVED BY VOCATIONAL AGRICULTURE INSTRUCTORS

A Critique

Bob R. Stewart, University of Missouri-Columbia--Discussant

The authors are to be commended for studying a timely topic which is important to the profession. The role of bioscience/biotechnology in programs of agriculture is an issue that must be examined.

They have presented data from a national sample and an effort was made to contact non-respondents. The authors dealt with a variety of aspects related to bioscience/biotechnology and addressed perceptions of teachers in terms of what was important as well as evaluating their commitment to the use of bioscience information in programs of agriculture.

As we work through the paper, it would have been helpful to have a more comprehensive review of the literature to provide a stronger theoretical base tying instruction in bioscience/biotechnology to secondary programs of agriculture. Specifically, a definition of bioscience/biotechnology would have been helpful. The problem for study was clearly identified and appropriate objectives were formulated. The data were collected from a stratified random sample of teachers using a carefully developed instrument. However, it would have been helpful to know how data were gathered from non-respondents and what basis was used to conclude no significant differences between respondent groups.

The results section was at times confusing. It would have been helpful to have the results section organized in the same order as the objectives were presented. In addition, it would have been helpful to have known the terms used on the scale. For example, a mean of 4.53 at one point was referred to as "agreed" as was a mean of 4.33. For other items, a mean of 4.31 was noted as "moderately agree," and a mean of 3.73 was noted as "observed." This ambiguity in terminology made this findings section somewhat difficult to understand. In addition, the discussion for the final objective would have been strengthened if the NVATA regions were identified by location as well as number.

The conclusions and recommendations appeared to be appropriate for the discussion. However, a section specifically addressing the discussion of the findings rather than having them interspersed in the results section would have been helpful.

The authors are to be commended for presenting information on a topic that is important to the profession.

A PANEL STUDY OF THE ASPIRATIONS OF RURAL YOUTH IN OHIO

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INTRODUCTION

Panel studies are used to follow the same group of subjects over a period of time. They enable examination of changes or trends. These differences between one point-in-time and another point-in-time may be due to changes within respondents or to societal trends. Rural communities, rural schools and rural youth have been facing economic stress in recent years. Local, state and national policy makers have found the delivery of educational services in rural areas increasingly challenging as rural populations have declined after a population surge in the 1970's, as student numbers have declined reflecting a general trend in school populations, and as economic resources have become more scarce due to the worsening farm economy and the general decline in state revenues in many U. S. states...The problem is particularly acute at the secondary education level where increasing demands by the public and state agencies for expanded curricular options are focused...Rural schools are encountering formidable challenges as they seek to make advanced electives available to their youth and to provide a curriculum that serves all of their children - those who pursue further education and those who enter the work force after leaving high school. (Thomas, 1987)

Students of high academic ability have had a wider range of educational and occupational opportunities available to them because of the premium American society has placed on academic achievement and the upward social and economic mobility it offers. The status of parents has been shown to influence the academic achievement of children. In turn this academic achievement influences the aspirations and expectations of students (Marini & Greenberger, 1978).

Aspirations have been shown to be among the most significant determinants of eventual attainment (Gottfredson, 1981). Among the first studies comparing the aspirations and expectations of rural and urban students were those conducted by Lipset (1955) and Sewell & Orenstein (1965). These studies concluded that rural youth had lower aspirations than urban youth and as a result they could not compete effectively for urban jobs. More recently Lee (1984) pointed out that rural workers were well behind their urban counterparts in vocational development.

Occupational aspirations have been shown to be influenced by the background and experience of the student. Aspirations are expressed in occupational goals, curriculum choices, and educational plans.

Study of the impact of the unique characteristics of rural schools on the educational and occupational aspirations of rural youth has not been widespread (Odell, 1986, p.43). Rural schools have been characterized by their small sizes, sometimes depressed economic situations, inability to maintain balanced staffs, and difficulty in offering broad and varied curriculum.

Vocational agriculture has been the program for public school education in agriculture. Agricultural instruction must fit within the context of the entire school curriculum as an elective subject. It is increasingly difficult for college-bound rural youth to enroll in a course which provides the opportunity for them to develop a career interest in agriculture. This difficulty is expected to impact increasingly upon enrollment in higher education in agriculture.

In the Spring and Fall of 1985 data were gathered from four randomly selected rural schools representing four different geographical regions within the state of Ohio. Questionnaires were administered to all of the 10th and 12th grade students in each of the schools to ascertain their educational plans, occupational aspirations, and high school curriculum patterns. A portion of the findings from this study were reported by Odell (1986) who found rural high schools in Ohio emphasizing preparation for college attendance, enrolling students from families with low socioeconomic status, having students with much higher educational and occupational aspirations than that which their parents had attained, having students with unrealistic expectations for salary, and with aspirations of students influenced by parents expectations for them. He also discovered that students were planning careers in areas that were sex stereotypic (Odell, 1989). A major question remained as to the extent the aspirations of these youth changed over time.

PURPOSE AND OBJECTIVES

An underlying purpose for this programmatic research effort was to respond to a need to understand the impact of changing rural communities on the aspirations of youth. This panel study was conducted to ascertain changes in the aspirations of rural youth as they matured during their high school years and entered college or the work force. Specific objectives were to answer the following research questions:

1. What are the sources of influence on rural youth as they make curriculum and career decisions in a 3-year period of time?
2. What changes occur in a 3-year period of time in desired and expected careers of rural youth?
3. How confident are youth that their occupational expectations will be realized?
4. How is gender related to expected salary, plans for further education, and level of aspirations?
5. How is the high school curriculum related to aspirations?

PROCEDURES

Procedures are reported under the headings of design, data source, instrumentation, and procedures to reduce errors.

Design

This study was descriptive survey. The major purpose of a descriptive survey is to describe the sample on the variables of interest, which were identified in the objectives. Relationships were analyzed to answer the research questions.

Data Source

Data were gathered in the first one-half of 1988 from a sample of the same subjects who were 10th and 12th graders in the 1985 study to determine changes which occurred in the 3-year period. Complete addresses were available for 352 subjects who participated in the 1985 study. Useable responses were obtained for 191 subjects, a 54% response rate, after use of telephone followup procedures. Comparisons between respondents and non-respondents were done on 1985 data. Respondents were more likely to be female, in the academic high school curriculum, and have a higher grade point average than non-respondents. The 1985 10th graders were nearing graduation or just out of high school and the 1985 12th graders had been out of high school for three years. These data were used to assess the durability of aspirations, education plans and occupational interests over this period of time. The sampling frame for rural schools included those schools located in a county outside a Standard Metropolitan Statistical Area, which were located in an Ohio county of less than 40,000 people, which had less than 125 students in the average high school class, and which offered agriculture as a high school subject.

Instrumentation

Data were collected using a Student Information Questionnaire. Some student information was collected from the high school records. Questions for the instruments were written using instruments from previous research by Odell (1986) and the current work of the principal investigator. The content validity of the instruments was established by a panel of experts consisting of university faculty, school administrators, and former high school teachers. The instruments were pilot tested in a school that was not included in the sample for the study. An average test-retest reliability coefficient of .84 was obtained across questionnaire items.

Procedures to Reduce Errors

Appropriate steps were taken to reduce the five types of errors (measurement error, sampling error, frame error, selection error, and non-response error) normally associated with this type of research. While there was non-response error, its nature was reported and documented.

ANALYSIS OF DATA

Information was summarized using descriptive statistics with the appropriate measures of central tendency and dispersion. Relationships utilized correlational techniques. Coefficients were evaluated using an alpha level of .05.

RESULTS

Results are reported under headings relating to each of the five objectives of the study.

Sources of Influence

In 1985 these youth, while in high school, had ranked the top four sources of influence on curriculum and career decisions as: self, parents, friends, and counselors. In 1988, the youth who had graduated listed self, mother and father, friends, and teachers as the top influencers. The youth who were 12th graders still in school in 1988 listed self, friends, father and mother, and counselors.

The educational attainment of the mother was related to educational plans of their children. A Cramer's V of .32 was obtained between the educational attainment of the mother and plans of 12th graders to attend college. Only 43.5% of the students having mothers with a high school education planned to attend college, but 100% of the students having mothers with a college or advanced degree planned to attend college. All of the students with mothers having a college or advanced degree planned to attend a 4-year college or university. Students with mothers having a high school education chose either technical college (43.5%) or a 4-year college or university (41.3%).

Changes in Desired and Expected Careers

Duncan Prestige Ratings were used to score desired and expected occupational goals. In 1985, the rural young people desired careers with slightly higher prestige scores (45.96) than they expected to attain (43.54). They had higher expectations in 1988 (46.93) than in 1985 (43.54). Also, their expected career (46.93) was more in line with their desired career (47.41).

Higher salaries were expected in their chosen careers in 1988 than in 1985. In 1988, 37.4% expected first-year incomes above \$25,000; however, in 1985 only 16.7% of these same young people expected first-year incomes above \$25,000.

In 1985, 39% of these youth intended to attend junior college. In 1988, only 5% attended or planned to attend junior college. In contrast, only 10% planned to go to a 4-year university in 1985 but 48% were attending or planned to attend one in 1988.

Confidence Expectations Would Be Realized

In 1985, over 50% of the youth were unsure if they could achieve their expected occupations. In 1988, over 50% of the graduated youth were also unsure of whether they could achieve their expected occupations, but only 27% of the youth still in high school were unsure of achieving them.

Gender and Salary, Education, and Aspirations

Females expected lower salaries than males (Cramer's V = .46). Only 9.1% of the females expected a first-year salary in their chosen career to be above \$25,000; however, 51.0% of the males expected a first-year salary above \$25,000.

Females were more likely (86.4%) than males (68.9%) to attend college. Among high school alumni, 95.1% of the females and 88.9% of the males who attended college did so immediately after high school. Among 1988 high school seniors, 68.2% of the females and 53.3% of the males planned to enter college immediately following high school.

Males and females did not differ in Duncan Prestige Rating score on either desired or expected careers.

Curriculum and Aspirations

All senior students in the vocational curriculum had low to medium job aspirations as scaled by the Duncan Prestige Rating. In contrast, 85.8% of the academic curriculum students had medium to high job aspirations. The Cramer's V relationship between curriculum and job aspiration level was .37. There was not a significant relationship between curriculum and job aspiration level for those youth who had graduated from high school.

The high school curriculum followed by students was related to their educational plans. Nearly all (97.2%) of the students in the academic curriculum were likely to attend college; however, 46.2% of the students in the vocational curriculum were also likely to attend college. A 4-year college or university was the choice of 71.2% of the academic program students. Students in the vocational program chose either a 4-year college or university (24.0%) or a technical school (20%). Senior students in the academic program planned to attend college immediately after high school (83.3%), but only 30.8% of the vocational program students planned to begin college immediately. Among alumni, 93.5% of those who went to college did so immediately after high school.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions were developed based upon the findings of the study. Implications were drawn from the findings and conclusions. Recommendations are for further research.

Conclusions

School personnel appear to have less influence on student career and curriculum choices than parents and friends. The influence of school personnel appears to decline as students mature. Friends seemed to have had more influence on curriculum and career decisions in 1988 than 1985 for youth still in school and less influence on youth who had graduated.

The educational level of the mother seemed to influence whether a child would attend college and the type of college to attend. Mothers with more education had children with higher collegiate expectation. The educational level of the father was not related to the educational plans of the child.

Overall aspirations increase with increasing maturity. Salary expectations also seem to increase with increasing maturity. Expected occupations also become more in line with desired careers. The junior college became a less popular choice and the 4-year college or university a more popular choice for students as they matured.

High school seniors appear to be more confident of fulfilling their aspirations than graduates or students who are sophomores.

Even though females aspire to careers that are equivalent to males, and even though they are more likely to attend college than males, they expect lower salaries.

The curriculum followed in high school was associated with the level of job aspirations of students. Those youth in the academic curriculum had much higher aspirations than those in the vocational curriculum. Once students left high school, however, the difference in level of job aspirations between those who completed the academic and vocational curricula was less.

Students in the vocational curriculum were much less likely to attend college than students in the academic curriculum. However, nearly one-half of the students in the vocational curriculum planned to attend college.

Implications

Parents should be involved in educational and career planning with their children. They have a major influence on their children's decisions. Schools should inform parents about options so intelligent input can be given to youth by their parents.

Friends and peers also seem to influence the educational and career plans of students. The self-image and confidence of students should be developed to the point that educational and career decision-making will become an individual matter.

Because the educational level of the mother appears to be related to educational plans of students, schools should make a special effort to encourage students from homes where mothers possess less than a college degree to set high aspirations.

Students should be encouraged to set high aspirations. Expectations appear to become more in line with aspirations with increasing maturity. This seems to come from an increase in expectations rather than a decrease in aspirations.

Females should be encouraged to set higher salary goals. When aspirations and qualifications appear equal, salary expectations remain lower for females than males. This may be partially due to females choosing occupations that are sex stereotypic, and thus traditionally offering a lower salary than traditionally male occupations.

High school students who enroll in vocational education should also be encouraged to prepare for college attendance. Schools should develop options for students to complete both vocational education and college preparatory requirements. Many students change their aspirations relating to college and career during high school.

Recommendations

Recommendations for further research include: (1) comparisons between rural and urban students to determine similarities and differences between the

two populations, (2) comparisons between rural Ohio and rural communities in other states and regions to determine similarities and differences, (3) panel studies to ascertain trends in the image of agriculture as an educational and career option for students, (4) evaluation of the impact on rural communities of the highest-ability students pursuing careers which are unavailable in rural areas, (5) reasons for low salary expectations by females, and (6) further panel studies that focus on potential dropouts and students of lower ability, since these groups were under-represented in this study.

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A PANEL STUDY OF THE ASPIRATIONS OF RURAL YOUTH IN OHIO

A Critique

Thomas L. Grady, University of Wisconsin-Madison--Discussant

This study makes a unique contribution in helping us begin to understand influences on educational and career aspirations of rural youth. The use of panel studies offers an important dimension in observing operational changes of variables across time, an often overlooked consideration in determining relationships among variables or hypothesizing causal processes. I particularly liked the organization of the paper, with each question being discussed as delineated in the "Purposes and Objectives Section." Another positive about this paper is the development and linkage of this study to a previous one. I think we need to do more "building" efforts to develop and expand a growing body of knowledge in a focused area.

While positive in many respects, I would like to raise some questions and discuss a few selected areas for improvement in this study. First, it seems appropriate that the researchers begin to develop a framework from which a context of simultaneous influences yield testable hypotheses. This study, for example, posed isolated, separate questions that may be more appropriately conceived of in some theoretical way. Let me give an example. Duncan, Haller, and Portes (1971) offer a model of peer influences on student aspirations. This model asks similar questions to those being asked in this study but in a very systematic, ordered way with variables being shown in a hierarchical, causal fashion. Could the questions in this study be framed in such a way that I can begin to ask some "why" questions rather than just the extent to which aspirations of youth in the study differed from one time to another? Such a model would force us to think about what variables appear to come first in the process, what is the nature of the relationships (i.e. linear, curvilinear, etc.) what do the variables really mean, how much time lag is there between one variable and another in a causal process, etc? A second concern is that it may be questionable to make direct comparisons between the data in 1988 and 1985 given that only about half of the original participants responded in 1988. From the non-respondent comparisons, it appears that the 1988 respondents are not representative of the original group. This will make it difficult to determine if meaningful relationships were due to actual change in selected variables, or due to the different nature of the 1988 group, thus confounding the results. For example, 48% of the students were attending or planned to attend college in the 1988 group, whereas only 10% planned to go in 1985. It seems to me that this may due in large measure to the fact that the 1988 group was more likely to be in the academic curriculum rather than an implied overall increased interest in the group to attend college.

Another suggestion is to include implications for theory/theory building in the conclusions of the study. I am apprehensive when reading a host of recommended intervention strategies in an "implications" section of a study. When I read a host of "shoulds" to imply a certain action, I always ask if the research warrants such a statement and if we are sure that such a "should"

will result in the expected outcome. For example, the last implication stating that high schools should develop options for students to complete both vocational education and college preparatory requirements may be something we feel strongly about but I am not sure that we can imply that from this study. Second, why should females be encouraged to set higher salary goals? Does the study suggest this? The statement may be noble but can we say it as a result of this study? I would much rather see a discussion about how this study advances our understanding about the development of aspirations of youth. In particular, the researchers might show how a theory seems to be developing out of these findings or what these findings might say about the model proposed by Duncan, et al. (1971). Were there unexpected findings that might offer a different explanation of how students develop educational and occupational aspirations than that posited by Duncan, et al. (1971)?

I want to encourage the researchers to continue this line of inquiry. It is my opinion that this can have potential impact not only in agricultural education but in the social sciences, broadly. Putting your questions in a theoretical context can assist in pushing your research forward.

Duncan, O. D., Haller, A. O., & Portes, A. (1971). Peer influences on aspirations: A reinterpretation. American Journal of Sociology, 74, 119-137.

PERCEPTIONS OF AGRICULTURE FACULTY AT LAND GRANT INSTITUTIONS
IN THE NORTHEASTERN UNITED STATES CONCERNING
THE LAND GRANT MISSION

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INTRODUCTION

Land grant colleges and universities have played a major role in the improvement of agriculture and industry, not only in the United States, but world wide. A dedication to the mission of teaching, research, and service has been the key to success of the land grant system. "There are three major missions of the modern university: research, teaching, and public service - interdependent and mutually reinforcing, static while alone, dynamic in combination, these missions give a modern university its unique strength" (Duncan, Singh, & El-Omari, 1967, p. 15).

It has been the responsibility of faculty to perform in all areas of the land grant mission. "Most faculty have dual responsibilities, with some combination of teaching, research and extension. A few work with all three" (Knoblauch, Law, & Meyer, 1962, p. 6). In more recent times, however, faculty have felt the need to place more emphasis on research because of an advancement system which tends to reward research productivity and overlooks teaching or service activities. According to Gonzalez (1987) "...Tenure and promotion decisions are based primarily on research performance..." (p. 7). "Teaching, research, and service describe the threefold mission of the land grant university" (Kelly & Warmbrod 1986, p. 27). It is the dedication to all three areas of the mission that makes the land grant institution a truly unique concept in higher education.

PURPOSE AND OBJECTIVES

The purpose of this study was to solicit the opinions of faculty in colleges of agriculture in the northeastern United States regarding the importance of the threefold mission of land grant institutions. Information obtained from this study might prove helpful to administrators and faculty in improving and understanding faculty performance in each of the three areas of the land grant mission. The following objectives provided direction for the study:

1. To determine the perceived importance placed on teaching, research, and service by agriculture faculty at land grant institutions.
2. To determine perceptions of faculty regarding the extent to which teaching, research, and service are considered in faculty promotion and tenure decisions.
3. To determine faculty perceptions of support received for activities in the areas of teaching, research, and service.

4. To determine relationships between perceived importance, support, and consideration of teaching, research, and service and faculty demographic characteristics.

PROCEDURES

Data for this study were obtained using descriptive survey research methods. Following a review of related literature a two part questionnaire was developed by the researcher. The first part of the instrument asked faculty to rate the importance, support, and consideration given to teaching, research, and service on a scale of one to seven. One indicated a very high ranking and seven indicated a very low ranking. The second part of the instrument asked faculty to provide pertinent demographic information. The validity of the instrument was established using a panel of experts consisting of faculty in agricultural education and the associate dean for resident instruction. The instrument was pilot tested using faculty from the college of engineering and the coefficient of stability was determined to be $r = .82$.

The target population was agriculture faculty employed at 13 land grant institutions in the northeastern United States during the spring of 1988. In order to develop a sampling frame, a current list of agriculture faculty and their campus mailing addresses was requested from each of the 13 institutions. The 1986-87 Directory of Professional Workers in State Agricultural Experiment Stations and Other Cooperating State Institutions was used to construct a list of faculty for those institutions unable or unwilling to provide a list of faculty. Faculty members who held Cooperative Extension or administrative positions were excluded from the study. Krejcie and Morgan's (1970) formula for determining sample size and a proportional random sampling technique was used to select a group of faculty ($n=300$), who were mailed survey instruments. A total of 233 faculty members returned completed surveys, which provided a 77.6% response rate. Research has shown that late respondents are similar to nonrespondents, and a comparison of early and late respondents can be performed to allow generalization of the findings to the target population (Miller & Smith, 1983). Responses from the early and late respondents in this study were compared using the Mann - Whitney U statistical test. Responses were found to be similar, therefore it was assumed that nonrespondents were analogous to the respondents and results of the study were generalized to the target population.

ANALYSIS OF DATA

Data obtained from the study were analyzed using the Statistical Package for the Social Sciences, version x (SPSS-X). Descriptive and nonparametric statistics were used to analyze and summarize the data. For each of the characteristics of interest descriptive data were analyzed in the form of frequencies, percentages, means, and medians. Nonparametric statistics were used to determine the extent of relationship and agreement between selected demographic characteristics and perceived importance, support, and consideration for teaching, research, and service activities.

RESULTS

Faculty were asked to respond to nine statements indicating how they would rate the importance of teaching, research, and service relative to each of the statements. Possible responses were arranged on a seven point scale, with one indicating a very high and seven indicating a very low ranking. In response to seven of the nine statements, research received the highest median ranking: importance to this land grant institution (Md=1.0); priority to you as a faculty member (Md=1.0); nonfinancial support (Md=3.0); encouragement of colleagues (Md=2.0); financial support (Md=3.0); weighting in promotion and tenure decisions (Md=1.0); and importance to administrators relative to promotion and tenure decisions (Md=1.0). Teaching and service were ranked equally relative to the perceived importance to the land grant institutions (Md=3.0) and to administrators relative to promotion and tenure (Md=4.0). Faculty felt that teaching and research should be considered equally in promotion and tenure decisions (Md=2.0) and also rated them equally with regard to personal preference (Md=2.0).

Table 1

Median Rankings of Importance, Support, and Consideration of Teaching, Research, and Service

	Teaching	Research	Service
Importance to this land grant institution.	3.0	1.0	3.0
Preference to you as a faculty member.	2.0	1.0	4.0
Priority to you.	3.0	1.0	4.0
Nonfinancial support received for performance in each area.	4.0	3.0	5.0
Areas in which performance is encouraged by colleagues.	3.0	2.0	5.0
Financial support received for performance in each area.	4.0	3.0	6.0
The weighting of each in promotion and tenure decisions.	4.0	1.0	5.0
How you feel that each should be weighted in promotion and tenure decisions.	2.0	2.0	3.0
Importance to administrators relative to promotion and tenure decisions.	4.0	1.0	4.0

1 = Very High

7 = Very Low

In this study, service was divided into three categories: college or university service, professional service, and public service. Faculty were asked to rank these three categories of service based on the amount of time spent on each one. Respondents ranked service to the college or university as consuming the most time and public service as consuming the least.

Table 2

Median Rankings of Amount of Time Spent in Service Activities

Area of Service	Median
College or University	1.0
Professional	2.0
Public	3.0

Almost 48% of the respondents held the rank of professor. The mean years of experience at the college or university level was 17.1 years and the mean age of respondents was 48.4 years. Eighty eight percent of the respondents were male and 12% were female.

Table 3

Characteristics of Respondents

Characteristic	Frequency	%	Mean
<u>Academic Rank</u>			
Professor	111	47.6	
Associate Professor	90	38.6	
Assistant Professor	30	12.9	
Instructor	2	0.9	
Total	233	100.0	

Number of Years Teaching at the College or University Level

31 - 40	18	7.7	
21 - 30	65	27.9	
11 - 20	81	34.8	
0 - 10	69	29.6	
Total	233	100.0	17.1

Table 3 (continued)

Characteristic	Frequency	%	Mean
<u>Age</u>			
61 - over	26	11.3	
51 - 60	73	31.3	
41 - 50	73	31.3	
31 - 40	61	26.1	
Total	233	100.0	48.4
<u>Gender</u>			
Male	205	87.9	
Female	28	12.1	
Total	233	100.0	

The mean numbers of undergraduate and graduate classes taught per year were 1.85 and 0.94, respectively (Table 4).

Table 4

Number of Courses Taught at the Undergraduate and Graduate Levels

Number of Courses	<u>Undergraduate</u>			<u>Graduate</u>		
	F	%	Mean	F	%	Mean
0	39	16.7		77	33.0	
1	70	30.0		110	47.2	
2	70	30.0		31	13.3	
3	27	11.6		12	5.2	
4	11	4.7		1	0.4	
5	3	1.3		1	0.4	
6	7	3.0		0	0.0	
7	3	1.3		0	0.0	
8	2	0.9	1.85	0	0.0	0.94

Spearman rank order correlation coefficients were calculated to determine if relationships existed between the rankings of teaching, research, and service and the demographic characteristics. In response to nearly all statements there was a low to moderate negative correlation between number of courses taught at the undergraduate level and the perceived importance, support, and consideration of research and service. This indicated that the more undergraduate level courses taught the lower the faculty member rated research and service activities. There was a low positive relationship between age, years of experience, and academic rank for teaching and service relative to the preference of faculty. This suggests

that faculty with higher ranks show a slightly greater preference for teaching or service activities, probably because they are not as concerned with promotion and tenure which they perceive to be based primarily on research productivity.

To determine the extent to which faculty agreed on each survey statement Kendall's Coefficient W was computed (Table 5). Faculty generally agreed on the weighting of teaching, research, and service in promotion and tenure decisions (.73) and the importance of each component of the land grant mission to administrators relative to promotion and tenure (.69). Faculty members showed the lowest degree of concordance on the statement rating their preferences for teaching, research, and service activities (.22).

Table 5

Agreement of Respondents on Survey Statements

	Mean Ranks			
	Teaching	Research	Service	W
Importance to this land grant institution.	2.11	1.42	2.47	0.40
Preference to you as a faculty member.	1.88	1.65	2.47	0.22
Nonfinancial support received for performance in each area.	1.95	1.50	2.55	0.34
Areas in which performance is encouraged by colleagues.	1.98	1.52	2.50	0.34
Financial support received for performance in each area.	2.07	1.36	2.58	0.45
The weighting of each in promotion and tenure decisions.	2.05	1.34	2.61	0.49
How you feel that each should be weighted in promotion and tenure decisions.	2.18	1.12	2.71	0.73
Importance to administrators relative to promotion and tenure decisions.	1.79	1.68	2.54	0.41

* Kendall's Coefficient of Concordance 0=no agreement, 1=total agreement

CONCLUSIONS

Within the limitations of the study and based upon the results the following conclusions were derived:

1. Faculty perceive research to be the most important function of land grant institutions, followed by teaching and service which are considered equally important.

2. Faculty equally prefer teaching and research over service activities.
3. Faculty feel that research is the most highly supported activity at land grant institutions, followed by teaching and service, respectively.
4. Faculty believe that research is given the most consideration in promotion and tenure decisions, followed by teaching and service.
5. Faculty feel that teaching and research should be given equal consideration in promotion and tenure decisions.
6. Faculty believe that administrators place a great deal of importance on research and about equal emphasis on teaching and service in promotion and tenure decisions.
7. Faculty are encouraged more by colleagues and receive more financial and non-financial support for research than for teaching and service.
8. Faculty devote more time to college or university and professional service than to public service as defined in this study.

RECOMMENDATIONS

Based on the results of this investigation the following recommendations are offered:

1. Further research should be conducted to examine the viability of the threefold mission of land grant institutions. Perhaps the traditional delivery of the threefold mission is no longer necessary, or is in need of change.
2. Further research should be conducted at land grant colleges and universities to determine the extent to which these institutions are carrying out the teaching, research, and service mission.
3. Faculty and administration should work together to identify ways by which to evaluate the success of colleges of agriculture in carrying out the land grant mission of teaching, research, and service.

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PERCEPTIONS OF AGRICULTURE FACULTY AT LAND GRANT INSTITUTIONS IN THE
NORTHEASTERN UNITED STATES CONCERNING THE LAND GRANT MISSION

A Critique

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This was an interesting study in that it looked at the three arms of the university, teaching, research and service and how they were ranked in importance in various areas. Surprisingly, service was never defined as extension; however, service was divided into three categories, college or university service, professional service and public service. Faculty with extension or administrative appointments were excluded from the study.

Faculty perceived research as being most important but they would like to see teaching and research given equal importance in promotion and tenure. When asked which area they preferred- teaching, research or service- there was a low level of agreement.

An interesting set of statistical analyses was used in this study; for example, the median was used as a measure of central tendency. An explanation of why it was chosen would be appropriate. Why were the medians and the means so different; for example, in importance to administrators relative to promotion and tenure decisions?

The Kendall's Coefficient W was computed to determine the extent to which faculty agreed on each survey statement. This was an appropriate use of a little-used analysis; a complete table would include the chi-square statistic, the degrees of freedom and the test of significance.

The whole concept of the three missions of the university, teaching, research and service, seemed to be based on older references. Is there no new thinking on what is the mission? The recommendation was to examine the viability of the mission. Which one is in question, teaching? Or service? If university or professional services are taking more time than public service does that mean that faculty are spending too much time in committees and professional organizations?

RELATIONSHIP BETWEEN MENTORING AND CAREER DEVELOPMENT OF AGRICULTURAL EDUCATION FACULTY

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INTRODUCTION

The 1980s will likely be remembered as a decade of economic decline, financial cut-backs, and overall "belt-tightening" throughout much of American Society. This era of limited resources has resulted in a renewed interest in the importance of individuals to organizational success (Willbur, 1986). Employees are being recognized as valuable resources, and successful organizations are working to maximize their existing human resources.

The corporate world has recently been bombarded with literature emphasizing the value of people. Popular books by Peters and Waterman (1982), Kanter (1983), and Naisbitt (1982) stress the importance of human resource development to organizational success. The renewed interest in capitalizing on human resources has not escaped the academic world. Baldwin and Blackburn (1983) aptly pointed out that "in a labor-intensive enterprise like higher education, human resources are the most valuable commodity. The vitality and effectiveness of a college or university is directly linked to the quality, resourcefulness, and vigor of its faculty members." Today's conditions of limited resources and ever-increasing demand for accountability have made the optimum performance of faculty a top priority.

Faculty career development is recognized as an important factor in maintaining faculty vitality (Hynes, 1984; Ruch, 1984; Braskamp et al., 1982; Baldwin and Blackburn, 1983). Career development and advancement are believed to be influenced by a variety of personal characteristics; however, evidence suggests that environmental and organizational factors also play a significant part in the academic career development process (Fowler, 1982). One such factor is that of sponsorship or mentoring.

PURPOSE AND OBJECTIVES

The purpose of the study was to determine the extent to which the professional career development of university agricultural education faculty has been influenced by mentors, and to examine the relationship between mentoring and selected indicators of career development. Secondary purposes of the study were to identify functions performed by mentors, and to develop a profile of the mentors of university agricultural education faculty.

Objectives of the study were to: 1) determine the extent to which the professional career development of university

agricultural education faculty had been influenced by a mentor or mentors, 2) determine the relationship between mentoring influence and selected indicators of career development, 3) identify functions of persons serving as mentors to university agricultural education faculty, and 4) identify characteristics of persons serving as mentors to university agricultural education faculty.

PROCEDURES

The study was descriptive in design. The accessible population consisted of all agricultural education faculty holding positions at four-year colleges or universities in the United States. Faculty members in the population must have held a rank of assistant professor or higher, and have been listed in the 1988 Directory of Teacher-Educators in Agriculture, or the 1987 Agriculture Teachers Directory. A total of 279 individuals were identified as being eligible for inclusion in the study's population.

Data were collected using a mailed questionnaire. A research instrument was developed which consisted of four parts. The first part identified the functions performed by the respondents' mentors, and provided an indication of the respondents' perceptions of the extent to which their professional careers had been influenced by a mentor. The mentoring function items included in the instrument had been adapted from an instrument developed by Willbur (1986) which was used to study the influence of mentoring on the career success of business executives. Responses to mentoring function items were summed to generate an overall composite mentoring score. A post hoc reliability coefficient was calculated, and yielded a Cronbach's alpha of .88, indicating a high degree of correlation among the mentoring function items.

The second part of the research instrument provided descriptive information about the individuals who had served as mentors to the respondents. The third part was designed to generate information about the respondents' career development. All but two of the items in Part III were objective measures of commonly accepted indicators of career growth identified in the literature and by members of the researcher's committee. Two items were included to measure the respondents' satisfaction with their current professional position, and with their career progress. The measures were included because, according to Crites (1969) objective achievement is not highly correlated with an individual's feelings of success or failure. It should be noted that the instrument did not include any measure of teaching performance. Because of the difficulty of collecting reliable information on the teaching performance of individuals, it was not deemed feasible to do so for this study. Individuals were asked to report any awards they had received that were based on teaching performance.

The final part of the instrument contained questions intended to provide descriptive information about the respondents. Content and face validity of the instrument was determined through a panel of judges, three of whom were members of the agricultural education profession, and two of whom had considerable training in theories of adult development, and were familiar with the mentoring process. A usable return rate of 78.66% (220 instruments) was achieved.

ANALYSIS OF DATA

Data were analyzed using the Statistical Package for the Social Sciences X (SPSSX). Frequencies, means, standard deviations, and percentages were used to describe the data. Pearson product-moment correlation coefficients were used to examine the relationship between the composite mentoring score, and selected indicators of career development.

RESULTS

Nearly all respondents (93.65%) indicated that their professional careers had been significantly influenced by one or more individuals. In this study, the term mentor was used to describe these influential individuals. The definition of mentor was kept very broad due to the exploratory nature of the study. The level of perceived influence by a mentor on the respondents' career development was determined by calculating a composite mentoring score, based on responses to 27 items pertaining to functions performed by mentors. The possible range of composite scores was from 0 to 432. The actual range of scores was from 197 to 423.

Criteria were established, prior to administration of the questionnaire, that indicated level of mentoring influence, based on composite mentoring score. Respondents with scores of 378 or greater were determined to have experienced a high degree of mentoring influence on their professional career growth. Scores of 298 to 377 indicated a moderate level of mentoring influence, and scores of 219 to 297 indicated low levels of mentoring influence.

The majority of faculty (61.38%) indicated having experienced a moderate level of mentoring influence on their professional career development. Slightly over 20% reported low levels of mentoring influence, and 10.58% indicated that their mentor had been very influential in their career development.

To examine the relationship between mentoring influence and career development, 11 indicators of career development were selected, and a Pearson product-moment correlation coefficient calculated between respondents' composite mentoring score and their performance on each indicator of career development. As shown in Table 1, significant relationships were observed between mentoring influence and only two of the career development indicators.

Table 1. Pearson product moment correlations between composite mentoring scores and selected indicators of career development

Indicator of Career Development	Coefficient	Probability
Yrs. to reach assoc. prof.	.02	.408
Yrs. to reach full prof. ^a	-.19	.069
Administrative positions held	.12	.080
Nat'l leadership positions held	.03	.382
National awards received	.03	.382
Professional awards from state or local level	.09	.162
Journal articles published	.12	.080
Books authored or coauthored	.02	.408
Grants received	.20**	.009
Doctoral students advised	.07	.221
Master's students advised	.20**	.009

^a This correlation was computed for full professors only, using the number of years to move from associate to full professor.

**Significant at .01.

Table 2. Pearson product-moment correlations between composite mentoring score and indicators of career satisfaction

Indicator of career satisfaction	Coefficient	Probability
Satisfaction with current position	.286**	.001
Satisfaction with career progress	.337**	.001

**Significant at .01.

Two career development measures were also correlated with respondents' composite mentoring scores. Respondents' satisfaction with their current professional position, and their satisfaction with their career progress were both positively related to composite mentoring score (see Table 2).

Respondents were asked to indicate the degree to which they agreed or disagreed that their mentor had performed each of 27 selected mentoring functions. The most important mentoring functions were: influenced my career in a positive way, supported my efforts to advance in my career, took a personal interest in the development of my career, expressed pride in my success, recognized my potential as an effective educator, praised my efforts in the presence of others, been someone I could rely on for support during critical times, and used his/her influence to assist my advancement by recommending me for promising opportunities. The least important mentoring functions were: insisted I stand on my own at all times, helped me publish an article or book, assisted me by voluntarily taking on the role of teacher to improve my skills, and cautioned me to avoid actions that might harm my career.

The mentors described by university agricultural education professors were, in many respects similar to the professors themselves. The mentors and proteges were typically white males of a similar social class, employed as university professors, and holding doctoral degrees in agricultural education. Mentors were typically between 8 and 20 years older than their proteges, held the rank of full professor, and were considered by respondents to have considerable influence in their professional field. Mentors were identified, and provided the greatest professional support during the early stages of the protege's career, that is, during graduate school and the first professional position following graduate school.

CONCLUSIONS AND RECOMMENDATIONS

Most university agricultural education professors perceive their professional careers to have been significantly influenced by another person or persons. The extent of mentoring influence on the professional development of agricultural education faculty varies widely, and only a few individuals appear to have experienced intensive, comprehensive relationships that are typical of "true" mentorships. The majority of agricultural education faculty have experienced relationships that may more appropriately be described as role modeling, counseling, or guiding.

Mentors of agricultural education professors provide many functions for their proteges. Proteges consider functions pertaining to both career development and psychosocial development to be important. Mentors of university agricultural education faculty appear to fit the theoretical mentoring model in many aspects. They are similar to their proteges in race, social class, educational level and professional field. They are

considered by their proteges to be highly influential in their professional field. Mentors of university agricultural education faculty were most important to their proteges early in the protege's professional career.

Mentoring influence is not related to the performance of university agricultural education professors on most objective indicators of career development. It is, however, related to an individual's feeling regarding his or her satisfaction with his or her career. Professors experiencing higher levels of mentoring influence appear to feel more satisfied with their current jobs and with their general career progress or growth. It is possible that the emotional support gained through a mentoring relationship provides agricultural education faculty with the security of knowing they have a person to whom they can turn for advice or guidance. Such support may result in confidence regarding one's competence and performance.

The following recommendations are made to the agricultural education profession: Agricultural education faculty are influential in the career development process of younger professors and graduate students. All faculty should recognize the potential impact of their behavior and attitudes on the profession. Efforts should be made by each individual to develop and maintain realistic but positive attitudes regarding the agricultural education profession. High professional standards should be upheld by each faculty member.

Agricultural education professors benefit from a variety of functions performed by mentors. Many of these functions relate directly to the professional growth of the protege; however, functions that benefit the psychosocial development of the protege are also considered to be important. Agricultural education faculty who find themselves in mentoring roles should recognize the importance of the quality of the mentoring relationship, and strive to develop those aspects of the relationship that benefit both the professional and personal lives of their proteges.

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RELATIONSHIP BETWEEN MENTORING AND CAREER DEVELOPMENT OF AGRICULTURAL EDUCATION FACULTY

A Critique

Barbara Malpiedi Kirby, North Carolina State University -- Discussant

The focus on institutional accountability and especially the demand for optimum faculty performance in the institutions of higher education does support the problem clearly identified by the authors of this paper. The authors sought evidence from the literature upon which to base their research. They obviously found a lack of information in agricultural education at the higher education level pertaining to this area of research. One study completed by Moore and Knight briefly discussed mentor influence of prolific writers in the profession.

The purpose and objectives of the study were clearly stated. The procedures followed were appropriate for a population study which was descriptive in design. The authors are to be commended for obtaining a 78.66% return rate. However, it would be helpful to others who learn from reading the paper as to how they proceeded in achieving this rate for a population study. More importantly, any follow-up procedures used to minimize non-response error should be reported. The study is strengthened by the use of an instrument validated in Willbur's study. Reliability estimates were appropriately reported. Since the authors adapted the instrumentation to their own situation noted for the reader how it was validated.

The results addressed the research questions. As a reader, I am interested in knowing what the criteria were for establishing the composite range scores. Were the ranges arbitrarily assigned or perhaps based on Z scores, or standard deviations from the mean? The authors used appropriate statistical procedures. However, when reporting correlation coefficients, it is important to indicate not only the statistical significance, but also interpret the practical significance using an appropriate convention such as Hinkle's.

Conclusions and recommendations were supported by the findings. By discussing their recommendations, the authors helped the reader relate the information from this study back to the theoretical base of the paper. The paper was written in a scholarly fashion. However, for publication purposes, the references need to comply with APA style or another appropriate style.

I encourage the authors to engage in further research which more closely examines the processes of mentoring, including setting goals, conferencing, reflection, etc. which should occur in the profession. Perhaps more information about the 26 functions of mentoring used in the questionnaire could be expanded or serve as a basis for a future paper. The research is important to our profession which has little documented evidence as to how the profession promotes career development through mentoring.

SCIENCE-RELATED OBJECTIVES TAUGHT IN THE ADVANCED PROGRAM OF
VOCATIONAL AGRICULTURE IN LOUISIANA

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INTRODUCTION

The nature and purposes of both science and agricultural education in our public schools are undergoing change. In both disciplines, the level of knowledge and skill required of today's high school student is significantly greater than that required of the previous generation. In view of the changes, innovative curriculum materials and school practices are needed to insure student competence.

Previous efforts at improving science education in the United States were directed at curricular modifications in association with some teacher training or retraining. Curriculum development projects in science in the 1960's attempted to introduce into schools, points of view and conceptual approaches of expert scientists (National Science Board Commission, 1983). The effort was commendable, the results partially successful, but the ultimate educational impact fell far short of expectations. Current educational reform reports have been critical of the levels of student competence in science as well as other basic courses.

Many states have reacted to the reform reports by mandating revisions in the high school curricula so as to increase the required number of science credits needed for graduation. Typically, these revisions have meant that high school students would enroll in additional science courses such as general science, biology or chemistry. The Association for Supervision and Curriculum Development (ASCD, 1985) reports that as a result of new academic credit requirements, students merely "take more of the usual courses in the traditional subjects." According to the ASCD this would result in the withdrawal of students from elective courses and would "reduce rather than increase academic learning." The concluding result according to the American Vocational Association is that approximately 24 percent of the students who choose to enter the work force after graduation may be harmed by the new requirements (AVA, 1985).

As the number of required courses has increased, the number of elective courses available to the student has simultaneously decreased. In most cases, vocational education courses are considered as elective courses. Consequently, enrollments in vocational education have decreased as the number of required high school courses has increased. Dyrenfurth (1985) conducted a national survey of high school graduation requirements and concluded,

In state after state, the number of "basic" courses required for graduation is being increased. The variable result is a single-focus curriculum that gravely under serves students, for they

will have little or no time left in their secondary school years to take practical arts and vocational subjects (p. 43).

Production agriculture has been the primary focus of vocational agriculture programs in the United States. This focus is traced to two studies that widely influenced vocational agriculture curricula across the nation. The findings and recommendations in the Standards for Quality Vocational Programs in Agriculture/Agribusiness Education (1977) and a study Identifying and Validating Essential Competencies Needed for Entry and Advancement in Major Agricultural and Agribusiness Occupations (1978) were both dominated by traditional agriculture programs (National Academy of Science, 1988).

A change of focus has been heralded by the Committee on Agricultural Education in Secondary Schools in the report Understanding Agriculture: New Directions for Education. The committee concluded that major changes are needed within vocational agriculture. One suggested revision is to teach more science through agriculture which would lead to improvements in both agricultural and science education. The changing job market, particularly emerging occupations and technologies in agriculture, requires students to be literate in science. Warren Reed, in comments at the National Conference on Agriscience and Emerging Occupations and Technologies described these science-oriented modern programs.

Put in the simplest terms possible -- modern programs of agricultural education, if they are to adequately prepare their students for agriculture's emerging occupations, and/or for advanced education and training in agriculture, will not only ensure adequate science content of the curriculum, but will also ensure adequate visibility of that fact for students, parents, counselors and other influential people (Reed, 1988).

Some states are examining vocational education courses such as vocational agriculture for use as a means of teaching science competencies to high school students. In a limited number of states, students completing a sequence of vocational courses are allowed to substitute those courses for required science credit. In Oklahoma, the State Board of Education adopted a policy which allows a school to waive a unit of credit in mathematics and a unit of credit in science providing a student completes six units of credit in vocational agriculture. One unit of credit in either math or science may be waived if a student completes at least three units of vocational agriculture. In Virginia, a state policy allows for completion of a sequence of courses for occupational preparation in agriculture as an alternative to the requirement of a math or science course in the diploma program.

Since 1985, several states (Illinois, Missouri, North Carolina, Texas, and Louisiana) have initiated studies of the relationship between science competencies taught in traditional science courses and competencies taught in vocational agriculture. The studies report that a substantial overlap exists between science competencies and agricultural competencies or objectives. For example, Briers (1986) conducted a study to determine the extent to which vocational agriculture in Texas provided opportunities for students to develop concepts and skills in mathematics

and science. Seventy-five percent of the topics taught in vocational agriculture were judged by a panel of science teachers as developing concepts and skills in science.

In 1986, Moss conducted a study for the Louisiana State Department of Education to identify science-related competencies taught in the Basic Program of Vocational Agriculture in Louisiana (Ag I & Ag II). The following conclusions were made on the basis of that research.

1. A substantial number of science-related instructional objectives are included in the Basic Program of Vocational Agriculture in Louisiana.

2. The Basic Program of Vocational Agriculture in Louisiana contains science-related objectives in both levels of instruction, Vocational Agriculture I and Vocational Agriculture II.

3. The Basic Program of Vocational Agriculture in Louisiana includes overlapping objectives with each of the state-approved science courses.

4. The most commonality between vocational agriculture instructional objectives and science objectives is in the state approved course, Environmental Science.

5. Louisiana vocational agriculture teachers are teaching subject matter similar to science teachers in the public schools.

A recommendation from the study of the basic curriculum (Vo-Ag I and Vo-Ag II) was that a **similar study of the advanced curriculum (Vo-Ag III and Vo-Ag IV) should be conducted.**

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the extent to which science-related instruction occurs as a part of instruction in the Advanced Program of Vocational Agriculture in Louisiana. In order to achieve this purpose two objectives served as guidelines in the performance of the project.

1. To identify instructional objectives in the Advanced Program of Vocational Agriculture in Louisiana which are similar to competencies taught in state-approved science courses.
2. To determine the amount of time spent in vocational agriculture programs in Louisiana on science-related vocational agriculture instruction.

PROCEDURE

To accomplish the objectives previously outlined, the advanced curriculum guide for agriculture and the competency outlines for science were examined to identify possible objectives in agriculture that were science-related. The state-adopted curricula for the high school science courses, biology, chemistry, earth science, environmental science, general

science, physics, and physical science, were used as the source for identifying the competencies taught in high school science programs.

The Advanced Program of Vocational Agriculture in Louisiana (Bulletin 1725, Vols. I & II) was used as the source for identifying agricultural objectives taught in Louisiana vocational agriculture programs. This curriculum guide was published in 1983 by the Office of Vocational Education, Louisiana Department of Education, and is used in all programs throughout the state. This advanced program of studies, also referred to as Vocational Agriculture III and Vocational Agriculture IV, provides specialized training at the 11th and 12th grade levels.

Two groups of knowledgeable personnel assisted in the identification of the science-related objectives. Input from a sample of Louisiana vocational agriculture teachers was sought to determine science-related instructional objectives and time spent on science-related instruction. Two-hundred forty eight vocational agriculture teachers comprised the population from which the research sample was drawn. A sample size of 150 was determined using the formula for calculating the sample size needed when the size of the population is known and the response measure dichotomous as discussed in Educational and Psychological Measurement by Krejcie and Morgan (1970). The formula was calculated using a 95% confidence level for the table value of chi-square and 0.05 as the degree of accuracy expressed as a proportion.

A select sample of 15 Louisiana science teachers was asked to verify the appropriateness of the objectives identified as science-related by the vocational agriculture teachers. The science teachers were knowledgeable of vocational agriculture and served to further validate the objectives as being science-related.

A survey instrument was developed, validated, field tested, and sent to the sample of vocational agriculture teachers. The teachers were asked to determine if the listed objectives were science-related and to indicate the amount of time spent teaching the objectives.

RESULTS

Usable information was obtained from 107 respondents or 71% of the sample. A total of 21 instructional objectives from the Advanced Program of Vocational Agriculture in Louisiana curriculum guide were identified as being science-related. The greatest similarity between the curricula in vocational agriculture and a specific high school science course is in Environmental Science. Fifteen agricultural objectives were of similar content to the objectives taught in environmental science. It was also found that 3 of the 21 objectives overlapped with two or more science courses. The science-related agriculture objectives identified in the study are shown in Table 1.

Diagram illustrating the relationship between Agricultural Objectives and various science disciplines:

- Biology I
- Chemistry
- Earth Science
- Environmental Science
- Physical Science

Agricultural Objectives

- | State | Year | Population | Area | Density |
|---------|------|------------|--------|---------|
| Alabama | 1960 | 2,049,000 | 52,420 | 39.1 |
| Alabama | 1970 | 2,415,000 | 52,420 | 46.1 |
| Alabama | 1980 | 2,818,000 | 52,420 | 53.8 |
| Alabama | 1990 | 3,267,000 | 52,420 | 62.3 |
| Alabama | 2000 | 3,775,000 | 52,420 | 71.8 |
| Alabama | 2010 | 4,595,000 | 52,420 | 87.5 |
| Alabama | 2020 | 5,024,000 | 52,420 | 95.8 |
| Alabama | 2030 | 5,453,000 | 52,420 | 104.0 |
| Alabama | 2040 | 5,882,000 | 52,420 | 112.2 |
| Alabama | 2050 | 6,311,000 | 52,420 | 120.4 |
| Alabama | 2060 | 6,740,000 | 52,420 | 128.6 |
| Alabama | 2070 | 7,169,000 | 52,420 | 136.8 |
| Alabama | 2080 | 7,598,000 | 52,420 | 145.0 |
| Alabama | 2090 | 8,027,000 | 52,420 | 153.2 |
| Alabama | 2100 | 8,456,000 | 52,420 | 161.4 |
| Alabama | 2110 | 8,885,000 | 52,420 | 169.6 |
| Alabama | 2120 | 9,314,000 | 52,420 | 177.8 |
| Alabama | 2130 | 9,743,000 | 52,420 | 186.0 |
| Alabama | 2140 | 10,172,000 | 52,420 | 194.2 |
| Alabama | 2150 | 10,601,000 | 52,420 | 202.4 |
| Alabama | 2160 | 11,030,000 | 52,420 | 210.6 |
| Alabama | 2170 | 11,459,000 | 52,420 | 218.8 |
| Alabama | 2180 | 11,888,000 | 52,420 | 227.0 |
| Alabama | 2190 | 12,317,000 | 52,420 | 235.2 |
| Alabama | 2200 | 12,746,000 | 52,420 | 243.4 |
| Alabama | 2210 | 13,175,000 | 52,420 | 251.6 |
| Alabama | 2220 | 13,604,000 | 52,420 | 259.8 |
| Alabama | 2230 | 14,033,000 | 52,420 | 268.0 |
| Alabama | 2240 | 14,462,000 | 52,420 | 276.2 |
| Alabama | 2250 | 14,891,000 | 52,420 | 284.4 |
| Alabama | 2260 | 15,320,000 | 52,420 | 292.6 |
| Alabama | 2270 | 15,749,000 | 52,420 | 300.8 |
| Alabama | 2280 | 16,178,000 | 52,420 | 309.0 |
| Alabama | 2290 | 16,607,000 | 52,420 | 317.2 |
| Alabama | 2300 | 17,036,000 | 52,420 | 325.4 |
| Alabama | 2310 | 17,465,000 | 52,420 | 333.6 |
| Alabama | 2320 | 17,894,000 | 52,420 | 341.8 |
| Alabama | 2330 | 18,323,000 | 52,420 | 350.0 |
| Alabama | 2340 | 18,752,000 | 52,420 | 358.2 |
| Alabama | 2350 | 19,181,000 | 52,420 | 366.4 |
| Alabama | 2360 | 19,610,000 | 52,420 | 374.6 |
| Alabama | 2370 | 20,039,000 | 52,420 | 382.8 |
| Alabama | 2380 | 20,468,000 | 52,420 | 391.0 |
| Alabama | 2390 | 20,897,000 | 52,420 | 399.2 |
| Alabama | 2400 | 21,326,000 | 52,420 | 407.4 |
| Alabama | 2410 | 21,755,000 | 52,420 | 415.6 |
| Alabama | 2420 | 22,184,000 | 52,420 | 423.8 |
| Alabama | 2430 | 22,613,000 | 52,420 | 432.0 |
| Alabama | 2440 | 23,042,000 | 52,420 | 440.2 |
| Alabama | 2450 | 23,471,000 | 52,420 | 448.4 |
| Alabama | 2460 | 23,900,000 | 52,420 | 456.6 |
| Alabama | 2470 | 24,329,000 | 52,420 | 464.8 |
| Alabama | 2480 | 24,758,000 | 52,420 | 473.0 |
| Alabama | 2490 | 25,187,000 | 52,420 | 481.2 |
| Alabama | 2500 | 25,616,000 | 52,420 | 489.4 |
| Alabama | 2510 | 26,045,000 | 52,420 | 497.6 |
| Alabama | 2520 | 26,474,000 | 52,420 | 505.8 |
| Alabama | 2530 | 26,903,000 | 52,420 | 514.0 |
| Alabama | 2540 | 27,332,000 | 52,420 | 522.2 |
| Alabama | 2550 | 27,761,000 | 52,420 | 530.4 |
| Alabama | 2560 | 28,190,000 | 52,420 | 538.6 |
| Alabama | 2570 | 28,619,000 | 52,420 | 546.8 |
| Alabama | 2580 | 29,048,000 | 52,420 | 555.0 |
| Alabama | 2590 | 29,477,000 | 52,420 | 563.2 |
| Alabama | 2600 | 29,906,00 | | |

Table 1 continued

					Biology I
					Chemistry
					Earth Science
					Environmental Science
					Physical Science
					Agricultural Objectives
				*	Describe basic procedure to identify various metals
				*	Name and describe the three types of flames associated with oxy-acetylene welding
				*	List the different classifications of metals that can be cut with the oxy-acetylene torch
				*	Describe how an electric motor operates
				*	Identify common types of metal

To further document the teaching of these science-related instructional objectives, the vocational agriculture teachers indicated the amount of instructional time spent in teaching the objectives. The average hours of science-related instruction reported by the teachers is shown in Table 2. The advanced curriculum is divided into twelve subject matter categories. Additionally, local option hours are set-aside for the teacher to better meet student and community needs.

The greatest number of hours spent in science-related instruction is in the instructional area of Conservation. Teachers reported spending 11.4 hours of instructional time teaching instructional objectives that overlap with science competencies and an average of 4.8 hours on additional local option science-related objectives.

Six instructional areas, Farm/Agribusiness Planning, Employment Seeking Skills, Soldering, Tractor Maintenance, Small Engines, and Farm Structures contained science-related instruction only as a component of local option time. Overall, the teachers reported that approximately one-fourth (24%), of the instructional time spent in teaching the Advanced Program of Vocational Agriculture in Louisiana is spent on science-related instruction. Implications of these findings for future programming of vocational agriculture in Louisiana are discussed in the conclusions and recommendations that follow.

Table 2
Science-Related Instructional Time by Subject Matter Areas for the Advanced
Program of Vocational Agriculture in Louisiana

Instructional Area	Hours Teaching Science-Related Instructional Objectives	Hours Local Option
Farm/Agribusiness Planning	0	4.3
Employment Seeking Skills	0	4.6
Agricultural Chemicals		2.9
Safe Use of Chemicals and First for Poisoning	4.6	
Advantages and Disadvantages of Pesticides	4.3	
Conservation		4.8
Conserve Energy in the Home and at the Place of Business	3.3	
Natural Resources	3.1	
Wildlife	5.0	
Arc Welding		5.4
Metal Identification	3.8	
Oxy-Acetylene Welding		2.7
Set-up and Techniques of Welding Cutting and Brazing	6.0	
Soldering	0	2.2
Electricity		3.6
Operating Electric Motors	3.8	
Tractor Maintenance, Operation & Safety	0	4.2
Small Engines	0	9.2
Farm Structures and Facilities	0	4.4
Cold Metal		
Procedures for Working with Cold Metal	2.3	2.3
Hours of Science-Related Instruction	36.2	50.6
Total Hours		86.8

CONCLUSIONS and RECOMMENDATIONS

The following conclusions and recommendations are made on the basis of this research study.

Conclusions

1. Science-related instructional objectives are included in the Advanced Program of Vocational Agriculture in Louisiana and are being taught in vocational agriculture programs.
2. The Advanced Program of Vocational Agriculture in Louisiana includes overlapping objectives with five state approved science courses with the most overlap occurring for the science course, Environmental Science.
3. Teachers spend more "local option" time on science-related instruction than time spent on science-related objectives that are a part of the advanced curriculum guide.
4. Approximately one-fourth of the instructional time in the Advanced Program for Vocational Agriculture is spent on science-related instruction.
5. Less time is spent on science-related instruction in the Advanced Program of Vocational Agriculture than in the Basic Program of Vocational Agriculture.

Recommendations

1. Competencies in agriscience and emerging occupations and technologies should be identified and form the basis for an updating of the Advanced Program of Vocational Agriculture in Louisiana.
2. The advanced curriculum guide (Bulletin 1572) should be revised to reflect the changing scientific nature of modern agriculture.
3. Since a substantial number of agricultural objectives in the Basic and Advanced Curriculum for Vocational Agriculture in Louisiana overlap with the science course, Environmental Science, substitute credit should be sought for this course after updating the agriculture curriculum.

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SCIENCE-RELATED OBJECTIVES TAUGHT IN THE ADVANCED
PROGRAM OF VOCATIONAL AGRICULTURE IN LOUISIANA

A Critique

Bob R. Stewart, University of MissouriColumbia--Discussant

The study addressed a topic of current concern and builds on a previous study conducted by the author. The literature review documents the need for the study and appeared to be appropriate.

The results were clearly presented and the tabular presentation of data was helpful. However, additional information would have been helpful. While the problem was implied, it was never specifically stated. It would have been helpful to have a summary statement pulling together the literature review in formulating the theoretical base for the study and to provide a definition of the term "science-related." In addition, information about follow-up procedures, whether there was a difference between respondents and non-respondents, and a description of the procedures used for analysis of data would have strengthened the paper.

A review of the last section of the paper raised a concern about conclusion five which was related to the previous study. The amount of time spent in the beginning courses and referred to in the conclusion was not documented in the literature review. In addition, it appeared that information to justify recommendations one and two was not presented in the results section of the study.

The writer is to be complimented on reporting a systematic study of an issue of concern to the profession.

**STUDENT AND PARENT IMAGES OF VOCATIONAL EDUCATION OFFERINGS:
DECLINING ENROLLMENT IN VOCATIONAL EDUCATION**

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INTRODUCTION

Declining enrollment is a major concern for agricultural education programs all across the country. There are many plausible explanations for this decline. Population trends show a decline in the numbers of high school-aged students. Increased graduation requirements have put a lot of pressure on students to ensure that they receive adequate academic preparation. College entrance requirements have gone up, thus making students hesitant to commit a major portion of their high school program to vocational education. The increased requirements jeopardize the vocational course offerings that students are advised to take, especially if they are college-bound students. As a result, students are taking fewer electives in vocational education.

These pressures keep enrollment figures low. According to a report released by the National FFA Center, Participation in Selected FFA Activities, enrollment in secondary programs is on the decline. U.S. enrollment in vocational agriculture in 1982-83 was 611,361 compared to 532,917 students in 1986-87, a decline of 13% in only four years.

Miller (1988) examined measurements of images of the FFA by significant groups of people, including high school students enrolled and not enrolled in vocational agriculture, and parents. The strengths of the FFA were addressed, as well as improvements needed. Parents recognized a need to increase membership. Vocational agriculture students felt that public relations efforts were needed in order to improve the image of the FFA.

What do students think of when asked to think about vocational education? What are students' images of vocational agriculture? One student in this study commented, that he/she thought of "farmers being bored and discussing the eatable [sic] parts of a cow in a room." Is this a true picture of today's vocational agriculture classroom? Will this image lead to increased enrollment?

The choice to enter into a vocational education curriculum is a choice toward choosing a career. Lam (1982) classified barriers that influence a student's decision to not enroll in vocational education. This classification system divides the reasons into three main categories. The first category is intrapersonal reasons which includes: attitudes, perceptions, images, motivation, career maturity and value systems. The second category is immediate external reasons, which includes two sub-categories: school factors (distance to schools, friends, extracurricular activities) and influence of others (friends, parents, counselors, neighbors, teachers and other relatives). The final category is remote external reasons which includes socioeconomic status, parental income and parental educational levels. Choosing a career is a decision made by the student, with assistance from parents, friends, counselors and teachers. Super (1963) and Ginzberg (1951) believe that

occupational choice is influenced by both standards of the community and by internal impulses.

PURPOSES AND OBJECTIVES

This study investigated factors that influence a student not to enter into a high school vocational curriculum. More specifically, the following served as objectives for the study.

1. To determine the relationships between selected student characteristics (sex, race, socioeconomic status, curriculum choice) and images of vocational education.
2. To determine student and parent images of vocational education.

PROCEDURES

This study was developed as descriptive survey research. A cluster sample technique was employed. The population used in this study was all non-vocational 11th grade students in schools within the Southwest Ohio Region Personnel Development Center during the 1987-88 school year. Five schools were randomly selected from the population. All 11th grade, non-vocational students in these schools were surveyed. The sample was composed of 633, 11th grade, non-vocational students.

Students in the sample were identified by curriculum choice. They were classified as either academic (college preparatory) or general curriculum students. Guidance counselors sorted the students according to curriculum choice based on an established set of guidelines. Teachers and students also assisted in the sorting of students by curriculum.

A student questionnaire was developed by the researcher following the principles outlined by Dillman (1978). A review of related literature and research and interviews with educators assisted in the design of the instrument. The instrument was designed in order to obtain information about factors that influence a student not to enter into a high school vocational curriculum. The questionnaire was pilot tested and field tested. Construct validity was established by two panels of experts. Test-retest procedures were used to determine coefficients of stability for important questionnaire items. Pearson product moment coefficients ranged from .42 to 1.00. Cronbach's alpha was evaluated to determine the reliability of the summated scales. Cronbach's alpha coefficients ranged from .63 to .83. Questionnaires were personally administered by the researcher and research assistants.

A random sample of 16 parents were interviewed on the telephone in order to determine their images of vocational education. Parents responded to a set of ten questions.

ANALYSIS OF DATA

All completed questionnaires were coded and data were entered into a personal computer and analyzed using the Statistical Package for the Social Sciences. Statistical analysis included: descriptive, correlational and analysis of variance techniques. The telephone interviewer took notes and summarized parental responses.

RESULTS

Students' images of vocational education were measured with a composite score of students' responses to a list of potential reasons for not enrolling in vocational education. Students responded whether they strongly agreed (5), agreed (4), were unsure (3), disagreed (2), or strongly disagreed (1) with these reasons. Those who strongly agreed with the reasons (higher composite scores) were judged to have a negative image of vocational education. Those responding that they strongly disagreed (lower composite score) were judged to have a positive image of vocational education.

Student characteristics (sex, race, socioeconomic status, curriculum choice) were correlated with students' images of vocational education. Relationships show that students who are most negative are white and male, from a high socioeconomic status, and in a college preparatory curriculum.

There was a statistically significant ($p < .05$) difference in mean scores between males' ($\bar{X} = 2.84$) and females' ($\bar{X} = 2.71$) images of vocational education. That is, males had a more negative image of vocational education than did females. The low relationship ($\text{Eta} = .11$) indicates that only one percent of the variance in image score is explained by sex.

Students following an academic curriculum had a higher mean score (a more negative image of vocational education) ($\bar{X} = 2.88$) than students in a general curriculum ($\bar{X} = 2.61$). The difference in mean scores was statistically significant ($p < .05$). The low relationship ($\text{Eta} = .21$) indicates that only four percent of the variance in the image of vocational education scores is explained by curriculum choice.

There was a statistically significant difference ($p < .05$) between students' race and their image of vocational education. The relationship between race and image ($\text{Eta} = .11$) was low, showing little practical significance. White students had a mean score of $\bar{X} = 2.80$ showing they had a more negative image of vocational education than black students ($\bar{X} = 2.65$) or students from other races ($\bar{X} = 2.59$).

Students from the highest socioeconomic status had a statistically significant more negative image of vocational education ($\bar{X} = 2.95$) than did students from the lowest socioeconomic status ($\bar{X} = 2.69$). The practical significance is indicated by $\text{Eta} = .15$, indicating a low relationship.

Fifty-five percent of the students indicated that they had neither a positive nor negative image of vocational education. Thirty-one percent indicated that they disagreed with the statements (reasons for not enrolling) indicating they had a more positive image. One percent strongly disagreed with the listed reasons, indicating they had a very positive image. Twelve percent agreed with the statements, showing a negative image and one percent strongly agreed, showing a most negative image. The mean scores for the composite image scores was 2.77 indicating they tended to have a very slightly positive image of vocational education.

Images of vocational education were also determined through students' responses to an open-ended question: "Describe your thoughts when you think about vocational education." The comments (592) were categorized into positive, negative and neutral thoughts. Forty-six percent of the thoughts

were judged to be positive, forty-three percent were judged to be negative and eleven percent were judged to be neutral.

Positive thoughts were classified into eight categories. Sixteen percent of the 592 thoughts listed were of the opinion that vocational education was fine for students who do not go on to college. Eight percent of the thoughts centered around the idea that vocational education provides a good learning experience and opportunity. Six percent of the thoughts dealt with the issue that vocational education trains students for a specific type of career. Four percent of the thoughts indicated that vocational education helps a student become better qualified for a career.

Another four percent want to or plan to take vocational education courses. Three percent felt that vocational education prepares students for a career directly after high school. Another three percent indicated that vocational education could help you in the future. One percent said that vocational education is interesting, fun or exciting.

Negative thoughts were classified into eleven categories. Ten percent of the 592 thoughts listed were of the opinion that vocational education is all right for some people, but it is not for them. That is, they see benefits for others but it isn't good enough for them. Nine percent of the thoughts centered around the notion that vocational education is for troublemakers and that it has a bad reputation and poor image. Seven percent of the comments indicated that vocational education was not interesting. Five percent of the thoughts were of the opinion that vocational education is the easy way out. They felt it was not challenging and was too easy.

Three percent felt that vocational education limited their knowledge about other career choices. Two percent looked at vocational education as a program where a student works for half a day and then takes classes for half a day. They assumed the students in these cooperative classes needed the money. Two percent boldly proclaimed that they felt vocational education is a waste of time. Another two percent felt that vocational education is for low income, low intelligence students. Another two percent said that vocational education does not offer courses required for college. One percent indicated that scheduling of vocational courses was a problem. Another one percent felt that classes are too difficult.

Neutral thoughts were classified into three categories. Seven percent of the thoughts indicated that students never thought much about vocational education. Three percent indicated that vocational education reminded them of vocational agriculture and farming. One percent indicated they didn't know anything about vocational education.

In order to determine the parents' images of vocational education a telephone interview was conducted. Parents' images were similar to those of students.

The first question was, what are your feelings about vocational education? Two comments reflected that parents have a favorable feeling about vocational education. Two other comments felt that vocational education is well suited to some types of students. Two comments indicated that it can benefit students who do not go to college. One parent admitted that he/she has never thought about vocational education. Another thought that it is for

students interested in the classes the schools offer. One said they did not know what vocational education is about. One parent felt that it was fine for those who have already made their career choice and know what direction to take. One comment shared that the vocational education was a place for students who want to go to college. One realized that vocational education is important. One parent felt it was for below average students.

These parents were also asked to describe the typical vocational student. These descriptions reveal parents' images including positive, negative and neutral thoughts about vocational students. One thought that the students in vocational education were students who were not preparing to go to college. Another said that these students are smarter than we give them credit for. Students were described as being hardworking, ambitious, practical, work oriented, not school oriented, average, and that they like to work with their hands. One did not know what the typical student was like and offered no additional comment. One said that they did not hold a negative image of vocational students. Another parent felt that vocational students want to learn a trade and end up with a good job. The majority of parents' comments were judged to be positive.

CONCLUSIONS AND RECOMMENDATIONS

There were low relationships between student characteristics (sex, race, socioeconomic status, curriculum choice) and images of vocational education. The student who is most negative is a white male from a high socioeconomic status in an academic curriculum.

Students' images of vocational education were obtained from two sources of data. A composite score of students' responses to a set of reasons for not enrolling in vocational education indicated that students were very slightly positive about vocational education. The second source of data is from students' open-ended responses to the question, "describe your thoughts when you think about vocational education?" The comments were judged to be positive (46%), negative (43%) and neutral (11%).

Parents' images, as reflected in a telephone interview were similar to those of students. Many comments centered around the notion that vocational education is a beneficial program for students not planning to attend college.

Further research is needed in order to determine how students and parents arrive at their perceptions about vocational education. It is also advisable that researchers look at the future occupational training needs for the U.S. labor force. New vocational program offerings should be designed to meet labor market needs and student interests. If current programs are of little interest to those who did not enroll, alternative offerings need to be developed and marketed in an interesting fashion.

Many students indicated that they are not enrolling in vocational education because they are preparing to enter college. Vocational programs could be redesigned in order to serve the needs of these students. Vocational courses could be offered for enrichment, exploratory or investigative purposes. New delivery systems will need to be in place so the vocational elective classes can still be a part of the college bound students' schedules.

1

It is evident from this study that marketing efforts need to be increased. Many students and parents held neutral images of vocational education and indicated that they were uninformed.

One needs to look in depth at the students' negative images of vocational education. Each of these negative thoughts is a perceived barrier for student enrollment. Now that the barriers have been further identified, steps must be taken to reduce or eliminate these barriers.

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STUDENT AND PARENT IMAGES OF VOCATIONAL EDUCATION OFFERINGS:
DECLINING ENROLLMENT IN VOCATIONAL EDUCATION

A Critique

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A complex interaction of factors was recognized which affected declining enrollment. The magnitude of the decline was described using national data but there was no history of enrollment for the five schools in SW Ohio included in the study. The introduction was not well connected to a local or regional school issue thus the problem was somewhat vague. Was this a general academic question, or was there a genuine felt need in the Southwest Ohio region to address the image of vocational education?

If the purpose was to examine factors that influence students not to enter into a curriculum then the objectives appeared to be out of order. First, it was necessary to determine the images of vocational education, then analyze the variance among groups which describe complex relationships.

The review of literature used national findings to justify local inquiry. The literature review was based on agricultural education research while the study examined the image of vocational education. Lam (1982) identified three barrier classifications yet it was not clear how the research was used to establish hypotheses or instrumentation. The researcher assumed that students equated vocational education to career choice. However, the findings indicated students view vocational education from a larger picture.

The selection of subjects, research design, and data collection and analysis procedures were clearly stated. It was not clear as to the nature of the instrument(s) or their validity. The results were logical and clearly presented with sufficient information. The discussion tied to the results well. I found the normal distribution of image interesting and expected. Low relationships among the student characteristic variables caused me to question which characteristics have high relationships.

Results were mixed with conclusions. In general, the conclusions appear to be sound but left several unanswered questions. Some conclusions appeared to need more descriptive information about the local environment. I would like to know more about the environments of the five schools selected; the demographics, ethnicity, social and cultural influences, and many others which help to explain image. The survey technique may not be sophisticated enough to detect the nuance of image and the development of complex perceptions. Ethnography has found favor as a descriptive system. Perhaps it would provide more systematic information about the inquiry process and help frame the analyses of the data.

USING SELECTED ACADEMIC VARIABLES TO PREDICT STUDENT PERFORMANCE ON THE NATIONAL TEACHER EXAMINATIONS

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INTRODUCTION

Education will be a prominent topic as historians write about the decade of the eighties. At least eight studies or reports of national significance on education were released to the public in 1983 alone. Preceding and following that time period other reports were completed, each of which focused on excellence, or lack thereof, in our schools (Finch, 1987). Governor James B. Hunt, Chairman of the Education Commission of the States told Commission members that for too long, the education issue slept quietly in the national consciousness. He indicated, however, that the giant had suddenly awakened; education had leaped onto the front pages and the network news as an issue of paramount national importance (Hunt, 1983).

In a speech at a regional hearing, on January 9, 1984, to the North Carolina Commission on Education for Economic Growth, Governor Hunt told the audience that the answer to the education problems in North Carolina was not just a lack of money and that the State had to do more with what resources it had. He indicated that as agendas were prepared to address the quality of education in the State, the top item on every list had to be the teacher. Governor Hunt attested that the State needed to attract and retain the best teachers and to provide them with working environments which promoted good teaching and effective learning. He also indicated that the State needed to recognize and reward effective teachers and remove incompetent teachers.

At the insistence of the Governor and other legislative leaders, the 1985 North Carolina General Assembly directed the Board of Governors of the University of North Carolina to establish a Task Force on the Preparation of Teachers by October 1, 1985 and to report the findings and recommendations of its study to the 1987 Session of the General Assembly. As a part of the charge to the Task Force, the legislation directed the Board of Governors to study: (a) standards for improved efficiencies in the administration of teacher education programs; and (b) ways to upgrade teacher preparation programs to make the course of study more rigorous and more effective (Board of Governors of The University of North Carolina, 1986).

The Task Force stated that it felt stronger standards, conscientiously applied, and not longer periods of study, offered the most promising solutions to the problem of making necessary reforms in teacher education programs so they could produce higher qualified graduates. Based on this position, a major Task Force recommendation called for specific action for strengthening teacher education program admission standards by increasing score requirements on the National Teacher Examinations (NTE) to the 35th percentile (Board of Governors of The University of North Carolina, 1986). In 1987 the minimum acceptable scores were 660 (14.5 percentile) for the Communication Skills portion of the NTE and 632 (19.7 percentile) for the General Knowledge portion. Since this recommendation has been accepted by the North Carolina General Assembly, the North Carolina Department of Public Instruction has adopted a policy which requires that at least 70% of the program graduates successfully pass the various portions of the NTE in order for teacher preparation programs within the University of North Carolina System to obtain State

accreditation to operate as teacher training sites. At North Carolina State University students must successfully pass both the Communication Skills and General Knowledge portions of the National Teachers Examinations prior to being admitted into their professional methods course. In practice, this requires the students to successfully pass the two portions of the NTE by the end of their sophomore year.

Based on these requirements, the administration within the College of Education and Psychology at North Carolina State University has made a decision to raise the admission standards for students entering the College. The higher admission standard established for the Agricultural Education program within the College of Education and Psychology was primarily implemented as a measure to assure that students admitted would be academically capable of passing the various portions of the NTE and requires a minimum 2.3 freshmen academic admission index score. The admission decision for entering freshmen students at North Carolina State University is based on a freshmen academic admission index. A minimum 2.0 freshmen academic admission index score has been established by university officials for incoming freshmen students for all programs offered on the campus. The maximum index obtainable is 3.61 for male applicants and 3.71 for female applicants. However, the university officials have given the administrators within the various colleges and departments local autonomy to establish their own minimum admission index scores if they wish for them to be higher than the university minimum.

Since the effectiveness of teacher preparatory programs in North Carolina will be determined by the percentage of graduates who pass the various portions of the National Teachers Examinations, a need exists to identify readily available variables that can be used to predict student performance on the examinations. The results of such research could be used in arriving at better informed decisions about the performance of prospective teachers on the National Teacher Examinations and for advising, counseling, and/or making admission decisions concerning students seeking entrance into teacher education programs and the teaching profession.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine how well selected academic variables predict student performance of Agricultural Education majors on the Communication Skills and General Knowledge portions of the National Teacher Examinations. More specifically, the research objectives of this study, stated as research questions, were as follows:

1. To what extent can the freshmen academic admission index utilized at North Carolina State University be used as a predictor of performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations?
2. To what extent can achievement on the various portions of the Scholastic Aptitude Tests (SAT) be used as a predictor of performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations?
3. To what extent can achievement in university required freshmen English and math courses be used as a predictor of performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations?

PROCEDURES

The population for the study consisted of students ($N=106$) who were admitted to North

Carolina State University as freshmen students and who graduated from the Agricultural Education Program between July 1, 1981 and May 9, 1987. Transfer students who entered the Agricultural Education program other than through the regular freshmen academic admission process and graduated during the identified time period were not included in the population due to the fact that research data were not available for those students. The time period was selected to assure that all the program graduates would have been required to complete the current version of the National Teachers Examinations for certification to teach agricultural education subjects in North Carolina. The Annual North Carolina State University Commencement Bulletins for the academic years from 1981-82 through 1986-87 were used to identify the study population and served as the frame for the study. The research sample was randomly selected based on a formula established by Krejcie and Morgan (1970) and consisted of 84 program graduates.

Based on research by Brown (1974) and Tarver and Carr (1983), a decision was made to include the following academic variables as the independent variables for the study: (a) GPA in required freshmen English courses; (b) GPA in required freshmen math courses; (c) Scholastic Aptitude Test-Verbal (SATV) scores; (d) Scholastic Aptitude Test-Math (SATM) scores; and (e) freshmen academic admission index scores. NTE - General Knowledge and NTE - Communication Skills scores served as the dependent variables for the study. Data for 1986 and 1987 graduates were obtained from a computerized data filing system in the College of Education and Psychology. Data for the remaining students was obtained from the students' permanent records from the Registrar's Office at North Carolina State University. For the purpose of analysis, student grades for the required English and math courses were transformed from letter grades to interval scores utilizing a typical 4.0 grading system.

ANALYSIS OF DATA

Using the Statview 512+ computer software program, stepwise regression analyses were employed to determine the strength of the relationship between each predictor variable and combination of predictor variables and National Teacher Examinations scores. According to Borg and Gall (1983), multiple regression is appropriate for analyzing interval, ordinal, and categorical data. Descriptive statistics were used to describe the sample.

RESULTS

The mean score for the sample for the Communication Skills portion of the National Teacher Examinations was 658.06 and the General Knowledge portion score was 661.12. These mean scores represented the 50th percentile for the Communication Skills portion and the 52nd percentile for the General Knowledge portion of the National Teachers Examinations based on 1987 NTE data. According to the data in Table 1, the mean grade point average, on a 4.0 scale, for the required freshmen English courses indicated that the grades earned by agricultural education graduates during the five year period under study were just above a "C" average. However, the grades earned by the research sample in the required freshmen math courses tended to be considerably higher. The SAT scores received by the agricultural education majors were typical of those currently being required for consideration for admission into North Carolina State University. The current admission criteria requires a minimum score of 400 on both the SATV or SATM and a minimum combined SATV and SATM score of approximately 900. The freshmen academic admission index is computer-calculated and includes the following variables: (a) total high school GPA, (b) rank in high school graduation class, (c) highest SAT-Verbal score, (d) highest SAT-Math score, and (e) a weighted factor representing sex of the applicant. The mean freshmen academic admission index score was 2.15 for the sample. This mean is below the 2.3 index which is currently being

required. However, during the period when the students making up the sample were admitted to the university, the minimum freshmen academic admission index scores required for admission into the agricultural education program ranged from 1.8 to 2.0.

Using the Davis Conventions, the correlation coefficients reported in Table 2 indicate that a very strong association existed between the independent variables identified as predictor variables and both of the dependent variables, NTE - Communication Skills scores and NTE - General Knowledge scores. The R values or .75 or higher also indicated that the relationship between the dependent and independent variables were linear, which helped to document that the assumption regarding specification error for using multiple regression analysis has been met in this study (Barrick, McCracken, Miller, Van Tilburg, and Warmbrod, 1986).

Table 1.
Means for Selected Academic Variables for Predicting NTE Communication Skills and General Knowledge Scores.

Variable	M	SD
Mean GPA		
Freshmen English	2.33	.68
Freshmen math	2.70	.94
SAT scores		
Verbal	425.95	83.64
Math	487.74	87.47
Freshmen academic admission index	2.15	.42

Notes: Maximum GPA for required English and math courses = 4.0, Maximum SAT-Verbal scores = 800; Maximum SAT-Math scores = 800; and Maximum freshmen academic admission index score = 3.61 for males and 3.71 for females.

Data in Table 2 indicate that the SATV had the strongest correlation with and was the best predictor of student performance on the Communication Skills portion of the National Teacher Examinations, (NTE - CS). According to Borg and Gall (1983), the second predictor is not chosen on the basis of its product-moment correlation with the criterion when using stepwise regression analysis. Rather, the second predictor is chosen on the basis of how well it improves upon the prediction achieved by the first variable. The same principle is used for selecting additional predictors, that is the third predictor is chosen on the basis of how well it improves the prediction achieved by the first two predictors, and so forth. Further, to be included in this regression model, the variables needed to represent a change in the R^2 increment which was significant at the .05 level. Borg and Gall (1983) indicates that the R^2 increment test needs to be done to determine whether the R^2 for each new predictor added to the multiple regression analysis is significantly different than the R^2 for the analysis without the predictor.

In this instance, student performance on the required freshmen English courses was the second best predictor. The two predictor variables, SATV and required English courses, together yielded a multiple correlation coefficient of .765 and represents the best prediction one can make for student performance on the NTE - CS based on the predictors studied. Based on the R^2 values in

Table 2, the researcher can predict approximately 59 % of the variance in student performance on the NTE - CS with this model.

Barrick et al. (1986) cautions that in general, R^2 , the proportions of variance in the dependent variables explained or accounted for by the variance in the independent variables, calculated on a sample tends to overestimate the population R^2 . However, an adjusted R^2 attempts to correct the optimistic bias of the sample R^2 . The degree of overestimation or R^2 is influenced, among other things, by the ratio of the number of independent variables to the size of the sample. Based on the fact that the adjusted R^2 values reported in Table 2 for the prediction models established is only one hundredth of a point or less than the R^2 values indicates that an assumption can safely be made that the ratio of the sample size used in this study was adequate for the number of independent variables investigated.

Table 2.
Stepwise Multiple Regression of NTE Communication Skills and General Knowledge Scores on the Significant Independent Variables.

Variable	Stepwise multiple correlation R	Stepwise R^2	Adjusted R^2	R^2 increment	E
NTE - communication skills					
SATV scores	.750	.562	.557		107.897*
Required English GPA	.765	.586	.576	.024	58.684*
NTE - general knowledge					
SATV scores	.801	.642	.637		150.377*
SATM scores	.824	.679	.671	.037	87.734*

* $p < .05$.

Also, as reported in Table 2, scores on the SATV were found to be the best predictor of the variables tested for predicting student performance on the General Knowledge portion of the National Teachers Examinations, (NTE - GK). Student scores on the math portion of the Scholastic Aptitude Test (SATM) were found to be the only other predictor that was included in the model for predicting student performance on the NTE - GK. The two predictor variables, SATV and SATM yielded a multiple correlation coefficient of .824. The researcher can predict approximately 68% of the variance in student performance on the General Knowledge portion of the National Teachers Examinations utilizing student scores from the Verbal and Math portions of the SAT.

Analysis of variance tests were performed to determine whether the R^2 value obtained after adding each new predictor to the multiple regression analysis was significantly different than the R^2 value for the analysis without the predictor. As reported in Table 2, the addition of each new predictor to the multiple regression analysis models resulted in a statistically significant difference in the R^2 values than before the predictor was added. All the predictor variables utilized, in both the model for predicting NTE - Communication Skills scores and the model for predicting NTE - General Knowledge scores yielded F values which were statistically significant, ($p < .05$).

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study the following conclusions are drawn:

1. Student performance on the verbal portion of the Scholastic Aptitude Test (SAT) along with an evaluation of their performance in their required English courses can be used as good predictors for determining student success on the Communication Skills portion of the National Teachers Examinations.
2. Student performance on the verbal and math portions of the SAT can be used as good predictors for student success on the General Knowledge portion of the National Teachers Examinations.
3. Student performance in required math courses and their freshmen academic admission index scores should not be used as predictors for performance on either the Communication Skills or General Knowledge portions of the examinations.
4. The Board of Governors decision to raise the minimum passing score for the Communication Skills and General Knowledge portions of the NTE will not significantly affect agricultural education majors at North Carolina State University.
5. Since the average freshmen academic admission index score for Agricultural Education students who graduated between July 1, 1981 and May 9, 1987 was 2.15 and the admission index did not correlate significantly with performance on the Communication Skills and General Knowledge portions of the NTE, the higher admission index score of 2.30 established by the administrators within the College of Education and Psychology to insure a higher NTE passing rate is not statistically supported and will result in a reduction of the number of students admitted to the agricultural education program and the College.

Based on the findings of the study, the following recommendations are presented:

1. Individuals responsible for advising transfer students who are considering entering teacher education programs should review the students' performance on the verbal and math portions of the SAT and their performance in the required freshmen English courses, and offer advice relating to the students' potential for successfully completing the required National Teacher Examinations.
2. Administrators within the College of Education and Psychology at North Carolina State University should reconsider their decision to raise the freshmen academic admission index score and lower it to the 2.0 index which has been established by university officials as being acceptable for the rest of the university. This recommendation is based on the following; (a) the freshmen academic admission index score does not correlate statistically with student performance on the National Teachers Examinations, (b) the performance on the various portions of the National Teacher Examinations of agricultural education graduates between July 1, 1981 and May 9, 1987, who were admitted on 1.8 to 2.0 freshmen academic admission index scores, was higher than that being recommended by the University Board of Governors, and (c) the higher (2.3) freshmen academic admission index score will reduce the number of students who will be admitted to the agricultural education program and the College if potential students in the future obtain scores typical of those which were earned by the agricultural education majors who graduated between July 1, 1981 and May 9, 1987.

3. Additional research should be completed to identify other variables which could account for additional variance for predicting student performance on the Communication Skills and General Knowledge portions of the National Teacher Examinations.

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USING SELECTED ACADEMIC VARIABLES TO PREDICT STUDENT PERFORMANCE
ON THE NATIONAL TEACHERS EXAMINATION

A Critique

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As state education agencies set higher standards for teacher certification and licensing, teacher education programs must also set higher standards of performance for their students. A state requirement that all education majors must pass the National Teachers Examination at a specified level of acceptability and the increased admission requirements into the teacher education program are just two examples of new standards being established by many states.

The researcher is to be commended on identifying an important topic for study. The identification of academic variables that might be used to predict the success of education majors on the National Teachers Examination could be very helpful in the advising, counseling, and recruiting of students into teacher education programs and the teaching profession. The results from this study may be very useful to those teacher education programs whose state is now requiring education majors to successfully pass the National Teachers Examination.

Strengths

1. The introduction is concise and provides a theoretical basis for the development of the research problem.
2. The purpose and objectives have been clearly stated.
3. Procedures used in conducting and analyzing the study are adequately explained.
4. The results were reported clearly and concisely and were supplemented with appropriate tables.

The following ideas/questions are offered for the purpose of improving this paper and similar studies in the future.

1. Given that eight pages were allowed and only seven were used, it would have been beneficial to include more background information on the use of the National Teachers Examination in North Carolina and a possible explanation on what the researcher thinks might be the reason(s) why the freshman academic admission index score did not correlate statistically with student performance on either the General Knowledge or the Communication Skills section of the National Teachers Examination.
2. Are there certain variables in the freshman academic admission index that may have contributed to its not correlating statistically with student performance on the National Teachers Examination?
3. Based on the objectives and findings of this study, conclusion four needs to be explained in more detail.
4. In the recommendation section of the paper could the researcher identify some additional variables to research which could account for additional variance for predicting student performance on the Communication Skills and General Knowledge portions of the National Teachers Examination?

In conclusion the researcher is to be commended for this exploratory study on a topic worth examining. I would encourage the researcher to continue identifying variables that can be used to predict student success on the National Teachers Examination.

VALIDATION OF RESEARCH PRIORITIES FOR ADULT EDUCATION IN THE NORTH CENTRAL REGION

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INTRODUCTION

Changes in the industry of agriculture during the 1980's has occurred at a rapid pace. Information acquired in both formal and informal educational settings has quickly become outdated as new knowledge is generated on a regular basis. Although the number of agricultural producers in the United States has continued to decline in recent decades, the number of persons employed in related agribusinesses has increased (AgFocus, 1986). Therefore, the need for educational programs in agriculture has expanded beyond those directed toward increasing agricultural production (Harbstreit, 1987).

Recent changes in education have also contributed to the need for directing attention toward issues and problems relating to adult education in agriculture. Emphasis on continuing education and the trend toward life-long learning (Zemsky and Meyerson, 1985) necessitates that adjustments be made in educational programs for adults in agriculture. However before positive changes can begin, there is a need to determine the appropriate direction for future programs.

On October 1, 1988 a request for an NCR committee was approved by the Directors of State Experiment Stations in the North Central Region. The committee, labeled NCR158-Adult Education in Agriculture, met in January, 1989 for an organizational meeting. During the initial meeting the committee identified the need to validate research priorities related to adult education in agriculture. A subcommittee of three was appointed to conduct the validation procedure. Members of the NCR158 committee collectively identified research issues and problems which were included in the validation process.

PURPOSE AND OBJECTIVES

The central purpose of this study was to validate research priorities related to adult education in agriculture. Objectives developed to guide this research effort were as follows:

1. To identify research problems and issues related to adult education in agriculture in the North Central Region.
2. To validate the research priorities related to adult education in agriculture in the North Central Region.
3. To identify priority research issues related to adult education in agriculture in the North Central Region.
4. To determine if differences existed among the perceptions of state supervisors, teacher educators, and extension leaders concerning research priorities related to adult education in agriculture.

PROCEDURES

The population for this study consisted of all teacher educators and state supervisors of agricultural education in each of the twelve states in the North Central Region. The NCR158 committee also sought to secure input from extension leaders in the region. Therefore, each committee member was

asked to identify two persons from their state who would be able to respond to the survey from the perspective of state level Agricultural Extension. The accessible population was determined to include 110 agricultural educators, 43 state supervisors, and 24 extension leaders.

The data collection instrument used in this study was developed as a result of the cooperative efforts of the NCR158 committee. Each of seven segments of the instrument contained questions relating to issues or problems identified by members of the NCR158 committee. Respondents were asked to rate the importance of each question using a five-point, Likert-type, response scale which ranged from "1" = "no importance" to "5" = "utmost importance." Also, within each of the seven sections of the instrument, respondents were asked to rank each question in relation to other questions in the same section. Demographic data were also requested which included years of experience as a teacher educator, state supervisor, and/or extension leader, and the age and gender of the respondent. Instrument reliability was estimated by calculating a Cronbach's alpha coefficient for the dependent variables on the survey and found to be 0.95 for the rating scale and 0.89 for the ranking scale.

Cover letters and data collection instruments were mailed to the 177 possible respondents in the three subgroups outlined above. Two weeks following the initial mailing, a reminder postcard was sent to those who had not responded. After another two-week period, a second letter and instrument was sent to those persons who had not yet returned completed data collection instruments. A comparison of early and late respondents (Miller and Smith, 1983) was conducted to assess the feasibility of the assumption that those who had provided responses were representative of the population.

DATA ANALYSIS

The data were coded into an IBM microcomputer and the data file was uploaded onto the University of Missouri-Columbia mainframe computer for data analysis. Statistical analysis included the computation of both descriptive and inferential statistics. Descriptive statistics calculated for the purposes of data analysis included means, standard deviations, and frequencies. The inferential statistics were used to determine if there were significant differences in the responses among the three subgroups surveyed. Subgroup mean differences were examined using analysis of variance procedures followed by the Least Squares Means post hoc test. T-tests were used to determine if there was a significant difference between early and late respondents. Ranked data were not included in this paper. Ranked data were deemed necessary to enhance future interpretation of the data by the NCR158 committee.

RESULTS

Usable data were collected from 133 (for a 75 percent overall response rate) of a possible 177 respondents. Thirty-three instruments were collected from state supervisors, 73 from teacher educators, and 22 from extension leaders. The respondents included 14 females (2 state supervisors, 9 teacher educators, and 3 extension leaders) and 114 males (31 state supervisors, 64 teacher educators, and 19 extension leaders). The amount of experience reported by each of the subgroups ranged from 15 years for the teacher educator subgroup to approximately 9 years for the state supervisor subgroup. Extension leaders reported an average of 12 years of experience. The average age of all respondents was approximately 46 years.

Table 1

Top Ten Research Questions Related to Adult Education in Agriculture

Research question	N	$\bar{X}$	SD
What should be the focus of adult education in agriculture in terms of philosophy, mission and target audiences?	130	4.12	0.05
How effective are adult education programs in agriculture?	131	4.10	0.15
What impact will continued urbanization have on policy-makers' decisions to support adult education programs in agriculture?	130	4.07	0.16
What competencies are needed by adult educators who work in various formal and nonformal educational environments?	130	4.00	0.10
How does adult education in agriculture influence rural development?	131	3.98	0.11
What motivates adults to participate in adult agriculture education programs?	128	3.98	0.12
How can instructional technologies be utilized to deliver adult education?	130	3.97	0.12
What are the most effective and efficient models of preparation of adult educators in agriculture?	130	3.97	0.12
Who needs adult education in agriculture?	131	3.93	0.16
Who should be responsible for the conceptualizing, funding, administering, delivering, and evaluating of adult education programs in agriculture?	130	3.93	0.16

The results of the t-test procedure revealed no significant differences in the responses of early and late respondents. Therefore, the data collected from those who responded was assumed to be representative of the population (Miller and Smith, 1983).

Research objective one, to identify research problems and issues related to adult education in agriculture in the North Central Region, was completed by the NCR158 committee and was incorporated as research questions in the questionnaire.

The second research objective, to validate the research priorities related to adult education in agriculture in the North Central Region, was assessed by examining mean importance ratings. Each item included in the data collection instrument received a mean importance rating in excess of 3.35. Teacher educators, state supervisors and extension leaders in general perceived all of the items in the questionnaire to be of at least some importance.

Research objective three was to identify priority issues related to adult education in agriculture in the North Central Region. Unweighted item means were computed and Table 1 contains the top ten research questions by mean rating as perceived by the respondents. Four items received a mean importance rating of 4.0 or greater. Those items were:

1. What should be the focus of adult education in agriculture in terms of philosophy, mission, and target audiences? ($\bar{X}=4.12$).
 2. How effective are adult education programs in agriculture? ($\bar{X}=4.10$).
 3. What impact will continued urbanization have on policymakers' decisions to support adult education programs in agriculture? ($\bar{X}=4.07$).
 4. What competencies are needed by adult educators who work in various formal and nonformal educational environments? ($\bar{X}=4.00$).
- Each of these items was judged to be the most important issue and problem which should be addressed in future research efforts.

Analysis of variance procedures were used to determine if differences existed among state supervisors, teacher educators, and extension leaders concerning their perceptions of research priorities related to adult education in agriculture as part of research objective four. Table 2 contains the subgroup means for each research question. Five of the 32 items included in the instrument were rated significantly differently among the three respondent subgroups. The item which asked "What social and cultural trends are affecting adult agricultural education?" received significantly higher ratings from the teacher educator group ($\bar{X}=4.08$) than from the state supervisors ($\bar{X}=3.39$). The item "What should constitute the adult education programs offered to commercial agriculture?" was also perceived to be significantly more important by teacher educators ($\bar{X}=3.75$) than by state supervisors ($\bar{X}=3.25$). The item "What should be the technical skills content of adult education programs in agriculture?" was rated higher by teacher educators ($\bar{X}=3.88$) and state supervisors ($\bar{X}=3.89$) than by extension leaders ($\bar{X}=3.06$). The item "What are the theories that explain how and why adults learn?" received a higher mean rating by teacher educators ($\bar{X}=3.63$) than state supervisors ($\bar{X}=2.93$). And lastly the item "What is the rationale for adult education in agriculture?" was rated higher by teacher educators ($\bar{X}=3.68$) and state supervisors ($\bar{X}=3.71$) than by extension leaders ($\bar{X}=2.80$). The remaining 27 items did not produce significant differences among the respondent subgroups and, furthermore, none of the top ten rated items produced significant differences among the respondent subgroups.

CONCLUSIONS AND/OR RECOMMENDATIONS

As a result of this research, the following conclusions and recommendations were developed. Teacher educators, state supervisors, and extension leaders believe research issues and problems related to adult education in agriculture are important. The highest priority for research in adult education in agriculture is to determine the philosophical basis, mission and target audiences for adult education in agriculture. The effectiveness of current adult educational programs in agriculture should also be examined. Future research should also be conducted to assess the influence which adult education programs have on rural development. Additionally, studies are needed to identify the philosophy, mission and target audiences of educational programs for adults in agriculture.

Table 2

Comparisons of Population Subgroups Regarding the Importance of Research Questions Related to Adult Education in Agriculture

Research questions	Population subgroups ^a			F	P
	TE	SS	EL		
	$\bar{X}^b$ (N=73)	$\bar{X}$ (N=33)	$\bar{X}$ (N=22)		
A. The Cultural, Social, Educational, and Occupational Trends Affecting Adult Agricultural Education Programs					
Who is providing adult education in agriculture?	3.43	3.89	3.31	2.66	0.07
Who needs adult education in agriculture?	4.00	4.11	3.69	0.83	0.44
What are the attitudes of decision makers toward adult agricultural education?	4.07	3.82	3.81	0.84	0.43
Who do adults turn to when they need to solve agricultural problems?	3.73	4.14	3.69	2.33	0.10
What social and cultural trends are affecting adult agricultural education?	4.08A ^c	3.39B	3.81AB	6.03	0.01*
What is the public perception of agriculture?	3.39	3.60	3.27	0.54	0.58
B. Assessment of Delivery Methods and Instructional Technologies for Adults					
How can instructional technologies be utilized to deliver adult education?	4.12	3.79	4.00	1.27	0.29
What instructional delivery systems are appropriate for urban audiences?	3.66	3.68	3.94	0.55	0.58
How should the present delivery system be modified for rural audiences?	3.73	4.07	3.63	1.53	0.22
What instructional methods improve adult learning?	3.90	3.79	3.67	0.29	0.75

Table 2 (continued)

Research questions	Population subgroups ^a			F	P
	TE	SS	EL		
	$\bar{X}^b$ (N=73)	$\bar{X}$ (N=33)	$\bar{X}$ (N=22)		
C. Evaluating Adult Education in Agriculture					
What are the costs and benefits associated with adult education programs in agriculture?	3.95	3.96	3.56	0.74	0.46
How effective are the instructional materials used in adult education?	3.38	3.64	3.56	0.75	0.47
How does adult education in agriculture influence rural development?	4.13	3.82	4.00	0.84	0.44
How effective are adult education programs in agriculture?	4.28	4.14	3.88	1.12	0.33
D. The Content and Organization of Adult Education in Agriculture					
What should constitute the leadership development programs for adults in agriculture?	3.83	4.00	3.75	0.29	0.75
What should adults in agriculture know about other countries and their agricultural systems?	3.43	3.54	3.38	0.13	0.87
What should constitute the adult education programs offered to commercial agriculture?	3.78	3.86	3.31	1.71	0.19
What should constitute the adult education program related to noncommercial agriculture?	3.75A	3.25B	3.31AB	3.20	0.04*
What should be the technical skills content of adult education programs in agriculture?	3.88A	3.89A	3.06B	3.75	0.03*

Table 2 (continued)

Research questions	Population subgroups ^a			<u>F</u>	<u>P</u>
	TE	SS	EL		
	$\bar{X}^b$ (N=73)	$\bar{X}$ (N=33)	$\bar{X}$ (N=22)		

E. The Policies and Administration of Adult Education Programs in Agriculture					
What should be the focus of adult education in agriculture in terms of philosophy, mission, and target audiences?	4.20	4.11	4.06	0.13	0.87
Who should be responsible for the conceptualizing, funding, administering, delivering, and evaluating of adult education programs in agriculture?	4.02	4.07	3.69	0.75	0.47
What impact will continued urbanization have on policymakers' decisions to support adult education programs in agriculture?	3.85	4.04	4.31	1.43	0.24
F. The Preparation and Continuing Education of Adult Educators					
What are the most effective and efficient models of preparation of adult educators in agriculture?	3.95	4.14	3.81	0.61	0.55
What competencies are needed by adult educators who work in various formal and nonformal educational environments?	3.88	4.14	3.94	0.53	0.59
How can you identify and augment the intrinsic and extrinsic motivators that encourage educators to assume a role in adult education in agriculture?	3.64	3.79	3.53	0.32	0.73
How are agricultural education extension departments responding to the changing needs of their adult educator clientele?	3.67	3.64	4.07	1.09	0.34
How are cooperative extension departments responding to the changing needs of their adult educator clientele?	3.60	3.64	4.20	2.32	0.10

Table 2 (continued)

Research questions	Population subgroups ^a			<u>F</u>	<u>P</u>
	TE	SS	EL		
	$\bar{X}^b$ (N=73)	$\bar{X}$ (N=33)	$\bar{X}$ (N=22)		
G. The Essence of Adult Learning in Agriculture					
What is the nature of the adult learner in agriculture?	3.90	3.43	3.33	2.99	0.06
What motivates adults to participate or not participate in adult agricultural education programs?	4.00	4.14	3.80	0.48	0.62
What are the theories that explain how and why adults learn?	3.63A	2.93B	3.13AB	5.40	0.01*
What is the rationale for adult education in agriculture?	3.68A	3.71A	2.80B	3.84	0.03*
How do adults in agriculture make decisions and solve problems?	4.00	3.75	3.80	0.62	0.54

^aPopulation subgroups are: TE = Teacher Educators; SS = State Supervisors; EL = Extension Leaders.

^bResponses were coded: 1 = No importance; 2 = Little importance; 3 = Some importance; 4 = Much importance; 5 = Utmost importance.

^cMeans having letter designations in common are not significantly different from each other (alpha = .05).

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Validation of Research Priorities for Adult Education in the North Central Region

A Critique

Edgar Persons, University of Minnesota, Discussant

General: Shinn and Buriak in a recent study reported that agricultural education research "lacked focus". This study is an attempt to redress that failing by trying to identify a series of issues or areas that could serve as the focus for research in adult education. The use of an NCR 158 committee supported by the Research Directors of the North Central region is an important step in both addressing the lack of focus reported in prior research and in utilizing the North Central research committee mechanism as a vehicle for getting started in some critical research areas.

The Study: A key ingredient in this study was the identification of the elements that were later to constitute the study instrument. Care was taken to assess the reliability of the instrument and to test the assumption of the similarity of non-respondents to those who responded. The researchers were persistent in seeking data and received an acceptable level of response provided their assumption on non-respondents was valid.

What should we remember about this study? Three important findings are worth remembering as we strive to improve adult education in agriculture.

1. All of the items in this list of 32 suggested research priorities or study areas were thought to be important. Policy makers are most likely to ask questions that focus broadly on policy concerns related to mission, evaluation, teacher preparation, technologies and accepting responsibility.
2. Teacher educators, state supervisors and extension educators do not all think alike. There are some priority areas where there are sharp differences. However, in the vast majority of cases, they were not significantly different in their views about adult education research priorities.
3. Adult education in agriculture may play a larger role in society than is now perceived. One of the top priority items was to answer the question of the role that adult education in agriculture plays in rural development. Perhaps a broader view of the impact of education in agriculture to look beyond just the clients we serve is warranted.

How could this study be improved? There are four areas where the authors may wish to examine their procedures.

1. Some attention to the theoretical basis for priority setting and past research done in adult education would have been useful.
2. If the authors elected to use sample based statistics (ANOVA) then it may have been more appropriate to define the North Central region as their sample area.
3. Some procedure that forced priority setting may have been more useful if it was the intent of the researchers to truly get a priority list of research questions.
4. It appears from the description of methodology that some useful data were collected and not reported.

MAKING A "MESS" OF
RESEARCH IN AGRICULTURAL EDUCATION

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The Ohio State University

Attending a meeting such as this is always enjoyable. We have the opportunity to share our research results, hear the results of the research of others, and renew old acquaintances or make new ones. As a person intimately involved with teaching and thinking about research methods for a decade, and involved on a more limited level for ten years before that; I particularly enjoy these meetings and getting to see our methods put into action. Further, I find that many of my strongest collegial relationships are with those who are doing research. In short, this meeting provides much to supplement each of our professional socialization.

I believe it has also contributed to our socialization as researchers. The more we meet and interact, the more we become alike. Now, some of this can be good, because to a large extent we have begun to move together to improve the overall quality of our research and the importance of the questions we are asking. Methodological understanding and congruence, though, has perhaps led us to feel more comfortable with research and that is good. However, being too much alike could be detrimental.

Interruptions to our sense of security do occur, though, such as when we are primarily quantitative researchers and we hear Gary Moore present a study employing historiography or hear Floyd McKenney challenge us to consider the more qualitative paradigm. Some dissonance is created in our little world. Let me assure you, I am not here to try to deal with the "paradigm war"(quantitative vs qualitative), which I (Miller, 1989), like Gage (1989) believe is a non-issue since all research in education is in search of knowing or developing a grand theory (Barnes, 1985).

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Paper presented to the National Agricultural Education Research Meeting, Orlando, Florida, December 1, 1989.

What I do want to address is our overall philosophy of research, our epistemology. Given the fact that more and more research is moving toward multidisciplinary or interdisciplinary perspectives, I believe we should, as a profession, begin to think about how we could fit into that scheme. We do have contributions which we can make. Many of you are highly skilled. Often more so than other university colleagues, but perhaps you are unaware of your competence.

A Scheme for Research Philosophies

In a presentation with limited time, I must limit myself to presenting concepts. You will need to confirm or disconfirm my thinking about our philosophy by reading and thinking. I want to open the dialogue on our philosophy and how such discussions can lead us to better understandings and better research, and a fuller role in the research community. And perhaps, we can be better competitors for grants and contracts.

Johnson (1986) presents a view of research which makes a lot of sense to me (Miller, 1989). His discussions of the interrelationships among the kinds of research done, philosophies used, and kinds of knowledge generated (Figure 1) help me understand what we are about.

- Kinds of Research

The kinds of research he classifies as disciplinary, subject matter and problems solving. The kinds of philosophies as logical positivistic (Does this mean that there exists illogical negativism?), normative, and pragmatic. The kinds of knowledge as positivistic, normative about values and normative prescriptive.

Borrowing from the Greeks, the impulses behind science can be described as scientia, techné, and praxis. Table 1 should help place these in perspective. Scientia is the drive to know and find out how and why the world is as it is, and has led to the reductionism idea that to understand things we break the problems down into small bits, i. e., Descartes' second theorem (Pritchard, 1968): "The second (was) to divide each of the difficulties that I was examining into as many parts as might be possible and necessary in order to solve it." This is the principle of analytical reduction which characterizes the Western intellectual tradition (Checkland, 1981). Thus, evolved the way we think about doing science and some say the most celebrated proposition in the history of humankind.

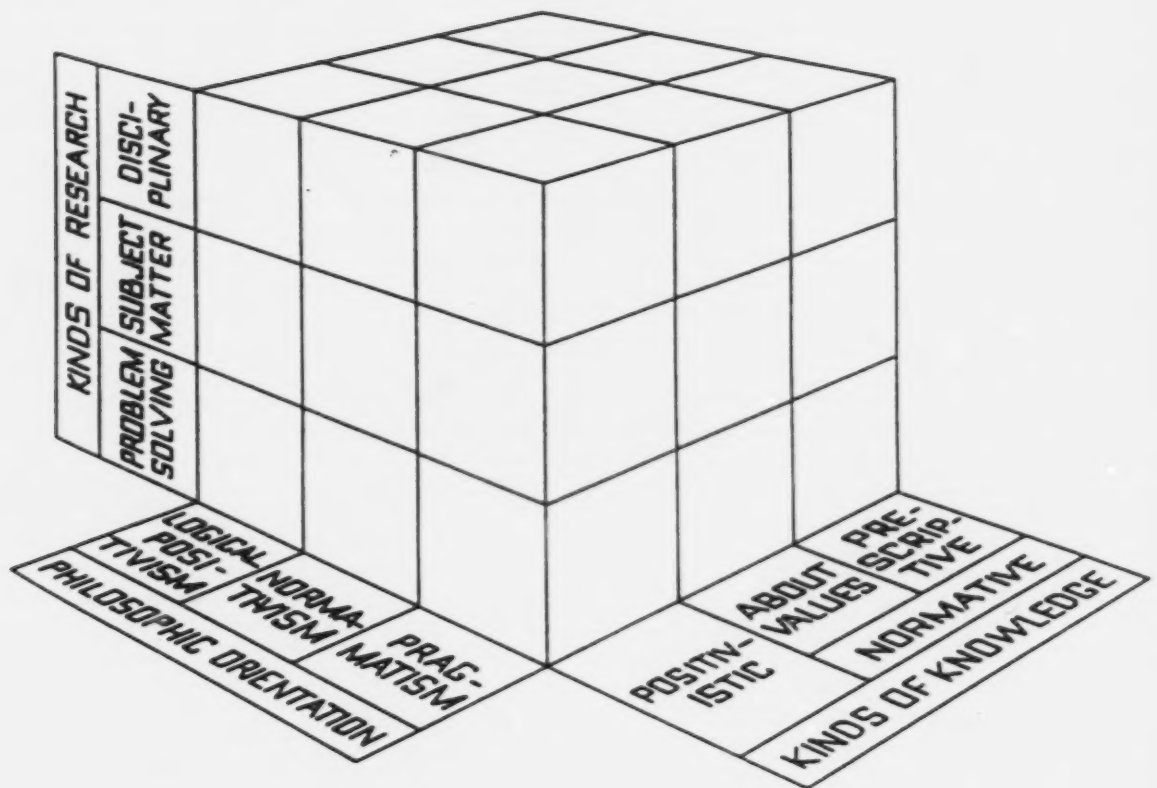


Figure 1. Interrelationships among kinds of research done, philosophies used, and kinds of knowledge generated

The techné component is our drive to do things better; to achieve practical ends. This helped evolve research in areas like engineering, management, systems analysis, economics, and the process-product research in education as described by Gage (1989). Mathematical formula as explanations may be the end sought.

Table 1
Some Distinctions between Research and Educational Traditions

	Scientia	Techné	Praxis
Focus	Learning for Knowing	Learning for Doing	Learning for Being
Knowledge Produced	Propositional	Practical	Experiential
Structure	Disciplines	Crafts	Issues
Teaching Style	Exposition	Demonstration	Facilitation
Teacher Role	Expert on Subject	Master of Craft	Co-learning Collaborator
Teaching Strategy	Lectures on Propositions	Demonstrations & "Hands-on"	Practicum & Internship
Basic Philosophy	Positivism	Utilitarian	Constructivism
Research Style	Basic (Experimental)	Applied (Developmental)	Action (Participative)
Research Goal	Abstract general knowledge	Solutions to work place problems	Local theory and Action for Change
Researcher Role	Producer of knowledge	Solver of technical problems	Co-creator of situation improvements

The praxis component is our desire to transform the direct experiences of people, places, events and things, and is essentially experiential in nature. It is based on certain issues and situations which cannot be unequivocally described, is unstructured and subject to continuous change and dependent on the perceptions of the individuals or groups. Much of social and behavioral science research has evolved as a result of this impetus. Reductionism (scientia) is often nonproductive to address these problems. How many "laws" can you recite for the behavioral sciences?

Disciplinary research (Johnson, 1986) is that "designed to improve a discipline" and may be of known or unknown relevance for immediate practical problems. The researcher is often very much a positivist in philosophy and is most often seeking positivistic knowledge, i.e., scientia -- reductionism. Or, perhaps looking to achieve "intellectual mortality" with ____'s Law. I propose that much of our desire for "programmatic research" efforts in this discipline is in the hope of establishing such names for ourselves. After all, if the physicists at the university can do it, shouldn't agricultural education researchers look just as good? Shouldn't you be known for your programmatic research contributions instead of your teaching or administrative abilities?

Subject matter research is "multidisciplinary research on a subject of interest to a set of decision makers facing a set of practical problems" (Johnson, 1986). Sex equity research, which has been studied in our profession, might fall into this category.

Problem solving research, according to Johnson (1986), is designed to solve a specific problem for a specific decision maker. We see many studies of this type in our discipline. Many of the "evaluation" studies would fall into this category, as would many others.

Kinds of Knowledge

The kinds of knowledge we are seeking presents a perspective on research. The reductionists most often seek positivistic knowledge; fact, principle or law. This is "synthetic knowledge that deals with characteristics of conditions, situations or things in the real world" (Johnson, 1986). When we want to know about the goodness/badness of conditions, situations or things; we pursue knowledge of values. Prescriptive knowledge deals with rightness/wrongness -- what ought to be or ought to be done, in the future tense; or what should not have been done in the past tense.

Philosophical Orientations

Our philosophical orientations dictate to a large extent how we look at a problem. Our philosophy dictate our Weltanschauungen (world view or world image). Much has been written about positivism, reductionism, recently because of the paradigm debate in education. Lewis (1955) notes that normativism is a collection of philosophies addressing value, goodness/badness and rightness and wrongness and generally result in prescriptive knowledge about what would be the best to do. Pragmatic philosophy is familiar to all of us because of our indoctrination with Dewey, James and Whitehead which has resulted in our vocational mentality and problem solving orientation.

Positivists might describe pragmatic researchers as "story tellers" describing particular situations which do not result in the "value free", reductionist knowledge they seek. Runes (1961) noted that pragmatism is always a doctrine of meaning. Copa (1980) reaffirmed this contention in his AVERA Presidential Address when he stated that the three categories of questions to be addressed by social science researchers are those of (1) meaning, (2) ends, and (3) ways and means. Pragmatists believe that the hypothesis that works is the true one (Runes, 1961). Positivists apply tests of coherence, correspondence and clarity to their theories, and pragmatists would insist upon adding "workability" to that list. William James [1907 (1955)] noted that the pragmatic method implies, "The attitude of looking away from first things, principles, 'categories', supposed necessities; and to looking towards last things, fruits, consequences, facts".

I want to maintain that each of us should understand our own philosophy as we conduct research. It will be imperative that we think beyond doing surveys, correlational, ex post facto, or experimental studies as we attempt to become players in the bigger ball game of interdisciplinary research; or simply to give deeper, fuller meaning to our own research programs.

Since the seventeenth century, a bias has predominated research in favor of the scientific method of reductionism as being able to explain everything in the world -- a method to derive events occurring at one level of organization from those occurring at another level: physics derived from chemistry. However, when the complexity of the problems increased as one went from restricted sciences to unrestricted sciences, it was found inadequate. The approach completely failed when applied to the social and behavioral sciences. A complementary paradigm must emerge which looks at the "wholes", much as organismic biology emerged from among the more positivistic biologists. Thus, evolves the concept of "holism" or "systems thinking".

Application to Agricultural Education Research

Checkland (1981) described some of the characteristics of systems which are essential for understanding. Raman (1989) noted that these must be understood because "systems" connote a whole gamut of interactive objects, activities, issues and attributes. To think of the systems in your body (endocrine, digestive, respiratory, etc.) may help as I discuss this. A system (S) will (Checkland, 1981):

- a) Have a purpose or can have a purpose sensibly attributed to it and which reflects the basic business of the system or its transforming function of inputs into outputs.
- b) Have a measure of performance (qualitative or quantitative) which reflects the extent to which the purpose is being achieved.
- c) Have mechanisms of self-regulation which (1) enables it to maintain its own coherence, (2) affects its overall transforming functions, and (3) somewhat paradoxically perhaps, enables it to grow or change (the process of self-creation or autopoiesis).
- d) Have components which themselves possess all the attributes of the S itself (although not its ultimate properties and functions) and which can thus be labeled subsystems (SS).
- e) Have networks of connecting mechanisms which enable SSS to interact with each other in ways which allow effects and actions to be transmitted and flow through the system.
- f) Exist within wider (supra) and/or environments with which it interacts (and, most importantly, coevolves)
- g) Can be distinguished from the supra-system and/or the environment in which it exists by a boundary which is neither part of the system itself nor its environment, but represents the interface between them
- h) Have both physical and abstract resources at its disposal by virtue of an internal environment as well as access to inputs from its external environment.
- i) Have some guarantee of continuity or coherence with the capacity to remain coherent in the face of internal or external forces of change, or return to coherence following change.

Based on these concepts, systems can be divided into four types: (1) natural systems which make up the universe, (2) designed physical systems which are made by humans, (3) designed abstract systems, and (4) human activity systems which are less tangible than designed systems, but clearly discernible. Human activity systems are only mental constructs based on particular Weltanschauungen to solve some real world problems and are thus different from the other three.

The complexity of research problems may span a spectrum viewed as "hard systems" on one end and "soft systems" on the other. A "hard" problem is a structured problem for which a tangible solution can be worked out by designing an appropriate system and optimizing its output. The paradigm (Ackoff, 1974) ultimately reduces to the evaluation of the efficiency of alternate means for a designed set of objectives, choose the best, and optimize its performance. Systems analysis, cost-benefit analysis and many evaluation models use these methodologies.

On the other hand, "soft" problems are those which are fuzzy and unstructured (Raman, 1989). The race problem, the drug problem, the education problem, the urban problem and the crime problem are all examples of "soft" problems. They are systems of problems. Ackoff (1974) calls such a system of problems: "A Mess". The Rand or Churchman (1968) systems analysis cannot approach such problems because they do not have concrete goals as do hard systems. The "soft system" is a "learning system" whereby even during the conduct of a research study the goals, elements, inputs or subsystems may change. Checkland (1981) describes the methodology (Figure 2).

Stages I and II are "expression" phases which are concerned with perceiving extensively and succinctly the problem situation and expressing the concern with all the Weltanschauungen about the problem situation. The richest possible picture is mapped, often called "mind-mapping", "dendrogramming" or "corralling".

In Stage III, a carefully phrased, explicit root definition of the system is constructed, which introduces the "systems concept". The root definition can be refined in iterative processes during the process and sometimes more than one root definition is required.

In Stage IV, conceptual models relevant to the root definitions are built up into human activities that the system should undertake in order to be the system so define. These are models of purposeful activities about the problem situation, considered relevant to debate and argue about what changes are to be brought about. The conceptual models are validated against the general principles of systems, and can be refined through multiple iterative processes.

SOFT SYSTEMS METHODOLOGY

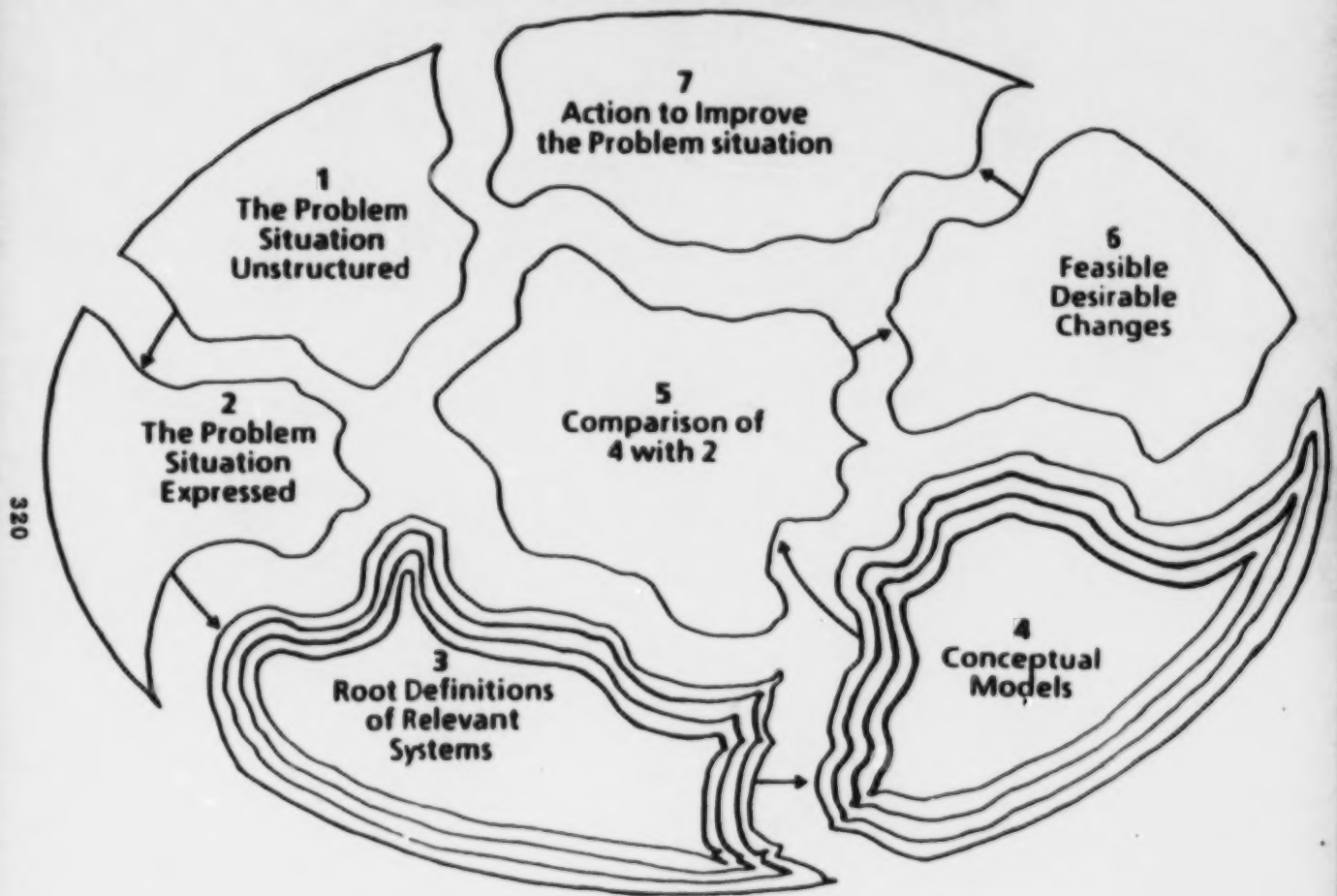


Figure 2
Adapted from Checkland (1981)

The CATWOE mnemonic is used to see if the model will improve the situation:

- C - customers, clients or beneficiaries
- A - actors or agents who carry out the main activities
- T - transformation process by which the inputs are transformed into defined outputs
- W - Weltanschauung or world view, which is the outlook, framework or image which makes the particular root definition meaningful
- O - owner of the system having a prime concern for the system and the ultimate power to cause the system to cease to exist
- E - the environmental constraints in the system, features of the system's environments.

In Stage V, conceptual models are compared with what exists in the real world, as seen in Stages I and II. This is done in cooperation with the real owners of the problem with the object of generating a debate about possible changes which might be introduced in order to improve the problem conditions (Raman, 1989).

Stage VI involves, based on the debate in Stage V, feasible changes in the system are worked out and recommended. With Stage VII consisting of the implementation of the action agreed upon for effecting the changes.

I perceive that this "soft systems" methodology has utility for us in agricultural education as we attempt to conduct research which is disseminated and utilized. Inherent within the methodology are suggestions for "action research". The need for systems thinking in our research in agriculture and education should be self-evident given the complexity of our problems. For those with some interest in the international arena, does the concept of "Farming Systems Research", although it is a "hard system", ring a bell? I believe that to begin "systems thinking" will help us to select more important problems to address. A "holistic" view of the "big picture" and how we fit into it can only benefit us as researchers. We must begin to look at our beliefs which underlie what we are doing, our ontology. Then, we can integrate our research programs into those of others: interdisciplinary or multidisciplinary.

Do we conduct research to solve problems in our profession? Do we conduct research just to publish so that we will survive in the "publish or perish environments" of the university — to survive the promotion and tenure process? Will we place the greatest professional value on just those who can most closely approximate the positivistic paradigm?

Entering the "Mess"

During the past year I have had the opportunity to interact with several people who are concerned with agricultural research systems. They acknowledge the need to look at the concept of "soft systems" research as they face the complex problems which exist in the real world. I believe this trend will continue and will impact not only the USDA, but our state experiment stations and university research programs as well. Let's be ready to be proactive, not reactive. Let's get ready to enter the "Mess of Research in Agricultural Education".

Using Raman (1989) as an example, let's look at an example from agriculture to begin to consider how agricultural education researchers might fit into this "mess". Begin with Figure 3, and note Ss 3. The situation is India, but could very well be any country or any complex problem. After following the appropriate stages, the root definition was:

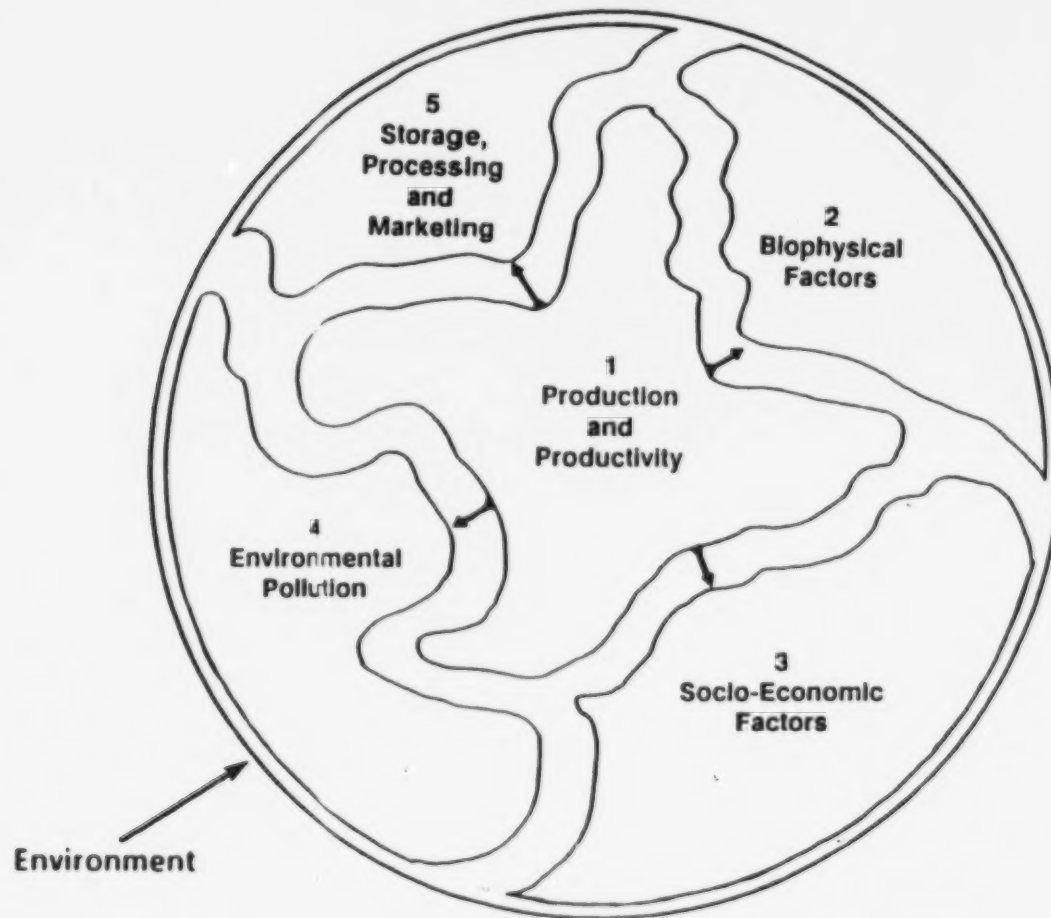
"A government owned agricultural research system to investigate the integrative role of plant nutrition, physiology and pathological factors in causing the coconut wilt disease".

Figure 5 shows some of the "mind mapping" that went into the process. Based on this root definition, a systems model was developed indicating that the major scientific research activities would initially proceed in the areas of soils and agronomy, plant physiology and pathology as the major Human Activity Subsystems (Figure 6). The typical activities and their linkages that would go on in each of these subsystems is also shown in the Figure.

I would particularly call your attention to sequences 5 and 7. Note that both involve learning: the learning from the "soft system" process and the learning achieved from the action research. Aren't we concerned about assessments of learning?

This example is from research in agriculture. Imagine all of the complex problems, the messes, we have in education. Education certainly deals with human activities. Soft systems methodology can apply to education as well. As researchers, we are already concerned with pragmatic research and we should be able to adapt to "systems thinking". If we continue with a mono-disciplinary mentality, we will fail to become full partners in the research process just when it appears that the window is beginning to be opened a crack. Let's get ready to enter the "Mess".

SYSTEMIC APPROACH TO AGRICULTURAL RESEARCH
Major Sub Systems



DENDROGRAMMING OF A PROBLEM

The Causes of Coconut Wilt Disease

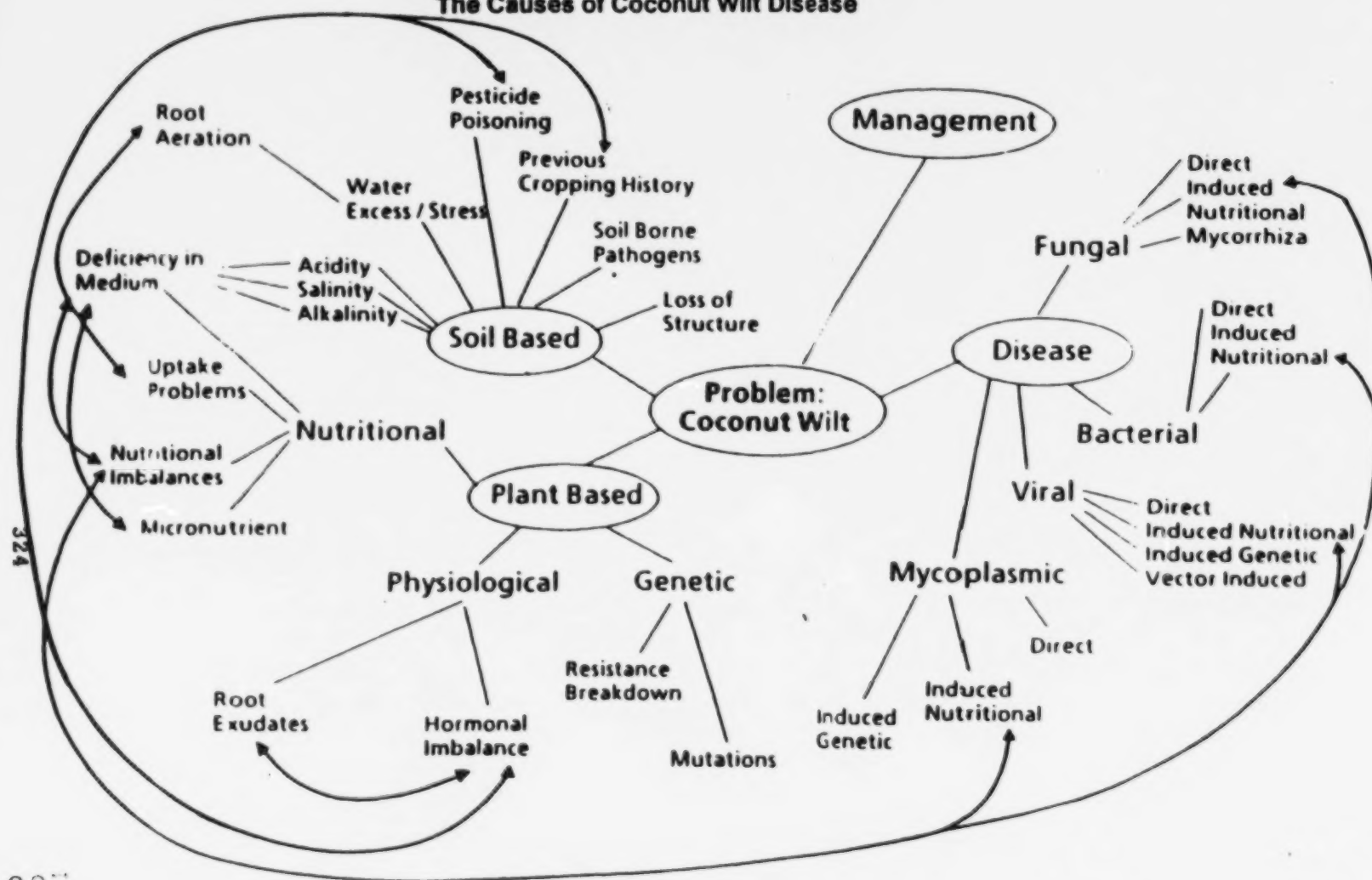


Figure 5

MODEL FOR INVESTIGATING THE CAUSES OF COCONUT WILT

Need to understand
the causes of Coconut - Wilt

Transformation

Need satisfied by deriving
scientifically supported
knowledge about CW

Pathological
Factors

1
Define
problem "X"

2
Formulate
hypothesis of "X"

Soil &
agronomy
factors

6
Define
criteria to
either support or
refute hypothesis

3
Set up experiment
to test hypothesis

4
Undertake
Experiment

Physiological
factors

5
Use criteria to assess
what has been learnt
from experiment

7
Monitor the learning
achieved & take
control action where
needed to ensure progress
in learning
about "X"

Output

Control action

Environment

339

Figure 6

Scientific activity sequence from Wilson (1984)

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CORRELATIONAL ANALYSIS OF SELECTED VARIABLES INFLUENCING SAFETY
ATTITUDES OF VOCATIONAL AGRICULTURE INSTRUCTORS
IN WEST VIRGINIA

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INTRODUCTION

Safety education and training is always stressed as an important factor in reducing injuries in the workplace. Teachers are becoming increasingly concerned with safety education and the duties and responsibilities of teachers in vocational agriculture programs. According to state and federal laws, school district are legally responsible for the safety of their students. Nichols was able to document in his 1986 study that:

... safety has always been a high priority of great concern by teachers as well as teacher educators. The research showed that there is a need for improvement in many safety areas. There seems to be a lack of research in the area of what improvement in skills the teachers needed to upgrade their safety knowledge and abilities. (p. 33)

Storm (1976) states that:

The responsibility for the physical welfare of the students rests with the instructor. Therefore, a comprehensive safety program, which guides students towards a positive safety philosophy and emphasizes safe procedures, offers the best protection for both instructor and student. (p. 119)

The vocational agriculture instructor's responsibility for quality safety instruction is, therefore, a never ending process which must provide students with accurate safety knowledge, positive safety attitudes, and a continuous safety role model. How well a teacher performs safety instruction depends on his/her own safety knowledge, safety attitudes, and degree of safety education training.

PROBLEM STATEMENT

The concept that an individual's experiences and knowledge influence safety attitudes should be considered in education. Safety instruction should include experience and knowledge which has an impact in developing proper safety attitudes of students. Do vocational agriculture instructors have similar experiences and knowledge bases that have an influence on instructor safety attitudes? Do vocational instructors with varying levels of teaching experience differ significantly in their attitudes towards safety? If so,

what experiences or training are contributing factors which make a difference?

CONCEPTUAL FRAMEWORK

The conceptual framework of this study was derived from Harper's (1984) "Model of the Development of Student Safety Attitudes." Harper's model was derived from two models of classroom learning. According to Harper (1984), "the first model was presented by Dunkin and Biddle (1974), 'A Model for the Study of Classroom Teaching' and the second was presented by McDonald and Elias (1976), p. 7) which represented a structured model of variables impacting teaching performances and student learning." The model in this study, "Development of Vocational Agriculture Instructor Safety Attitudes" has been derived from all the models mentioned above. This model portrays the relationship of the selected variables and the development of vocational agriculture instructors' safety attitudes.

PURPOSE OF THE STUDY

The primary purpose of this study was to determine the strengths and directions of the relationships between selected vocational agriculture instructor predictor antecedents and the instructor's measured attitudes toward safety.

DESIGN OF THE STUDY

The design of this study was an ex post facto\correlational design. This design was utilized because the nature of the collected data involved instructor experiences and properties which most likely occurred before the study.

VALIDITY AND RELIABILITY OF THE INSTRUMENT

The initial survey instrument for this study was derived from Harper's (1983) Student Safety Survey. The knowledge base section of the survey instrument was derived from the 1981 NIOSH/OSHA, Safety and Health for Industrial/Vocational Educational Manual. The survey instrument was also reviewed by staff members and safety professionals employed by West Virginia University to establish content validity and face validity.

The instrument consisted of 86 quantitative questions that were based upon a four point Likert-type scale, selected demographic characteristics, and two qualitative questions relating to types of injuries. The initial reliability coefficients for this instrument was established by a pilot survey of former vocational agriculture instructors. The revised reliability coefficients formed the matrix for the development of the final instrument.

The returned questionnaires were tested for reliability of the quantitative measures using Cronbach's Alpha technique. It should be noted that the reliability coefficient of one measure; Perception of School Safety Environment was unsatisfactory ($r=.27$). The remaining categories of the instrument ranged from $r=.65$ to $.81$.

DATA COLLECTION PROCEDURE

The data and information collection method used in this study utilized a questionnaire type survey. The survey was sent by mail to all vocational agriculture instructors in West Virginia.

Follow-up procedures consisted of a letter reminder, phone call reminders, and mailing of a new copy of the survey instrument and a follow-up letter stressing the importance of each instructor's participation in the study. The final phase of data collection was a phone survey of the nonrespondents which was utilized to determine nonresponse bias.

DATA ANALYSIS

The descriptive data for each variable of interest in this study were analyzed in the form of frequencies and measures of central tendency appropriate for the type of data. The correlational techniques used to determine the strength and direction of the relationships between the antecedents and consequence included Pearson Product Moment Correlational Coefficients. The magnitude of relationships were determined by utilizing Davis (1971) scale.

The criterion consequence, which consists of the vocational agriculture instructor safety attitudes, was treated as interval data within a regression equation. A simultaneous multiple regressing equation was applied to each group of variables (instructors formative experiences and properties, and process variables) to determine the proportion of variance which could be explained by each group of variables. This technique employed the use of semi-partial multiple regression correlational coefficients for each set of independent antecedents. Stepwise multiple regression correlational coefficients were used to determine the level of significance between instructor safety attitude scores and significant selected independent antecedents. F tests were used to establish significant relationships.

LIMITATIONS OF THE STUDY

The study was limited to the perceptions of the vocational agriculture instructors in West Virginia. A basic weakness of studies that rely on volunteer participation is that these persons responses may differ substantially from those nonrespondents. Therefore, it was necessary to survey a 10% sample of the nonrespondents to establish nonresponse bias. Based on the results of t-test analysis, there was no significant differences between respondents and nonrespondents.

SUMMARY OF FINDINGS

The target population for the study was all vocational agriculture instructors (N = 113) employed in West Virginia as of October 21, 1987. Of the accessible population, 89 vocational instructors responded. This provided a 79% sample of the total population for data analysis.

FORMATIVE EXPERIENCES AND PROPERTIES

A significant proportion of variance in the measured instructor safety attitudes was explained by the cumulative set of instructor formative experiences ($sR^2 = .2922$; $F = 3.57$; $p < .05$). Of the instructor formative experiences, the following indicated a significant relationship with the dependent consequence:

1. Home Setting ($r = .1376$)
2. Instructor Having Had a Serious Accident ($r = .3440$)
3. Friend/Close Relative Killed at Work ($r = .0929$)

SAFETY KNOWLEDGE AND ATTITUDE PROPERTIES

Each of the five selected instructor safety knowledge and safety attitudes properties did possess a significant relationship with the dependent consequence:

1. General Safety Knowledge ($r = .1842$)
2. Hazard Identification and Evaluation Knowledge ($r = .1858$)
3. Safety Skill and Attitude Development Knowledge ($r = .2458$)
4. Health Hazard Knowledge ($r = .44290$)
5. Instructor's Perception of His/Her Safety Attitude ($r = .3471$)

SCHOOL PROCESSES

All of the school processes antecedents had a significant relationship with the dependent consequence:

1. Administration's Safety Knowledge and Attitude ($r = .1464$)
2. Student Safety Knowledge ($r = .2905$)
3. Student Safety Attitude ($r = .4005$)
4. School Environment ($r = .2039$)

As a collective set of selected school processes antecedents, the set did explain a significant proportion of variance in the dependent consequence ($sR^2 = .0646$; $F = 2.56$; $p < .05$).

EDUCATIONAL TRAINING ANTECEDENT

The educational training process did not have a significant relationship with the dependent consequence. Educational training did, however, explain a significant proportion of the variance in the dependent consequence ($sR^2 = .0332$; $F = 5.28$; $P < .05$).

ATTITUDE PREDICTION

Stepwise multiple regression analysis was completed to determine a regression equation which could best predict instructor safety attitude scores. The following raw-scores regression equation was presented by Cohen and Cohen (1975):

$$y = B_1x_1 + B_2x_2 + \dots + B_kx_k + A$$

The instructor formative experiences, instructor knowledge and attitude properties, school processes, and college training process antecedents were included in the stepwise analysis.

The stepwise computations reveal that only three antecedents were significant at the $p < .05$. These three antecedents can be found in Table 2. The best predictors of instructor safety attitudes in order of significance were:

1. Instructor's Perception of His/Her Health Hazard Knowledge Base
2. Instructor's Having Had a Serious Accident in the Past
3. Instructor's with Horticulture for a Speciality Area

The multiple regression equation with the respective calculated raw-score partial regression weights (B's) and the intercept value (A) is as follows:

$$y = .35x_1 + 3.08x_2 + 2.33x_3 + 42.75$$

This equation represents those significant antecedents which best predict instructor safety attitude scores. The total multiple regression coefficient, $R^2 = .30$, represents the proportion of variance explained in the dependent consequence.

TABLE 1
STEPWISE MULTIPLE REGRESSION OF INSTRUCTOR SAFETY ATTITUDE
SCORES ON THE INDEPENDENT ANTECEDENTS

Independent Antecedent	R ²	R ² increment	F
Instructor's Perception of:			
Health Hazard Knowledge Base	.1841	.1841	18.95
Having Had a Serious Accident	.2589	.0749	8.383
Horticulture Speciality Area	.2997	.0408	4.782

$p < .05$

OPEN-ENDED QUESTIONS

The responses to the open-ended questions indicated that five of the most common accidents were minor cuts, crushed fingers, minor burns, scratches, and welding burns. The most common types of equipment involved in serious accidents included band saws, jointers, table saws, welding equipment, knives, and chain saws. The types of serious accidents listed by instructors were amputations, and severe large cuts. These injuries were inflicted by a variety of power equipment and hand tools. The types of common machinery

involved with the injuries included band saws, jointers, table saws, welding equipment and chain saws. It appears that students and instructors may not follow or do not know the proper safety procedures for operating these types of equipment.

DISCUSSION OF FINDINGS

The findings of this study indicate that there are several significant factors that influence the development of an instructors' safety attitudes. The first factor shows that as a set, formative experiences did explain a significant proportion of the variance in safety attitude scores. This suggests that an instructor's past experiences do have an influence on his/her safety attitude.

Second, all of the safety attitude knowledge base processes had an influence on an instructor's safety attitude score. The strongest relationship and the best predictor of an instructor's safety attitude score was calculated as being knowledgeable of health hazards. This suggests that instructor's who are aware of the health hazards in their programs seem to have developed positive safety attitudes.

Third, all of the school processes had a significant relationship with safety attitude scores. This study revealed that a moderate relationship existed between an instructor's perception of his/her students' safety attitude and instructor safety attitude score. Knowing this, instructors must stress positive safety attitudes and possibly learn positive safety knowledge and attitude traits from his/her students.

Fourth, the educational training process variable did not have a significant relationship with safety attitude score. However, the college safety training did explain a significant proportion of variance in the dependent consequence, safety attitude score.

Fifth, the findings of the open-ended questions shows that the five most common accidents were: minor cuts, crushed fingers, minor burns, scratches, and welding burns. (The types of serious accidents reported by vocational agriculture instructors included amputations and severe large cuts. These injuries were inflicted by a variety of power equipment and hand tools. The types of common equipment involved with the injuries included: band saws, jointers, table saws, welding equipment, knives and chain saws.) These types of accidents can often be prevented by utilizing property safety procedures and by developing a positive safety attitude.

RECOMMENDATIONS

The following recommendations were suggested by the researcher based on the findings of this study:

1. Studies need to be conducted to gather further information on the role of safety attitudes in the areas of accident prevention in vocational agriculture programs.

2. Studies need to be conducted to determine how safety attitudes influence specific types of accidents.
3. Further studies need to be conducted to determine other factors that influence safety attitudes.
4. Descriptive studies should be completed to obtain accurate accident information and statistics from vocational agriculture programs.
5. Studies need to explore the psychological and personality traits of students and instructors as they relate to safety.
6. Studies need to be conducted to examine administration characteristics or properties which may have an influence on instructor safety perceptions and knowledge.

IMPLICATIONS

Based on the finding of this study, the following implications for actual practice have been devised. This study stresses that the vocational agriculture instructors perception of their safety knowledge and safety attitude has a significant impact on their measured safety attitude score. It is very important that vocational agriculture instructors improve their safety knowledge base and develop positive safety attitudes. In order to accomplish this goal it is recommended that vocational instructors incorporate the following practices in their programs:

1. Develop a positive safety attitude.
2. Use correct safety procedure at all times.
3. Obtain and use accurate and current factual safety material.
4. Understand and follow the Occupational Safety and Health guidelines for vocational agriculture programs.
5. Provide a safe learning environment for all students.
6. Work with school administration to develop communication lines on safety related issues and concerns.
7. Develop a positive safety attitude.
8. Expect students to demonstrate safe practices, knowledge, and positive safety attitudes.

The preparation of future vocational agriculture instructors should include specific safety training which will familiarize preservice students with safety issues and safety information sources. Safety in-service training programs designed and implemented for vocational agriculture instructors can help promote safety attitudes and safe job procedures, to decrease accident rates in West Virginia's vocational agriculture programs. Also, instructors and administrators should evaluate the function and necessity of dangerous equipment in vocational agriculture programs.

Safety is an essential component of vocational agriculture. The severity of accidents and the abundance of accidents in agricultural related occupations is alarming. Accidents can be prevented if proper safety procedures and positive safety attitudes are developed in both the students and the instructors. The findings of this study provides information and future direction for the development of positive safety attitudes in

vocational agriculture instructors. Positive safety attitudes are a goal that all educators, administrators, and students must develop and preserve. Safety is a vital concept that can improve tomorrow's workplace and the quality of life for future generations to come.

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ENROLLMENT TRENDS IN AGRICULTURAL EDUCATION PROGRAMS AND FFA MEMBERSHIP

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INTRODUCTION

"The ever-renewing organization is not one which is convinced that it enjoys eternal youth. It knows that it is forever growing old and must do something about it. It knows that it is always producing dead wood and must, for that reason, attend to its new seed beds, the seedlings are new ideas, new ways of doing things, new approaches." (Gardner, 1964, p. 68).

In 1976, enrollment in agricultural education secondary school programs was at an all-time high of over 690,000 students, with an FFA membership of over 500,000. However, in the past 12 years, FFA membership has dropped to 400,000 with a proportional decrease in agricultural education enrollment (National FFA Organization, 1988). This drop in enrollment, about 1 to 3 percent annually, has led to teacher reductions in multiple teacher departments and, in some instances, complete elimination of agricultural education programs (Norris & Townsend, 1987).

Knight (1987) identified several factors influencing the decline in enrollment. First, the strong emphasis on production agriculture within programs. With less than three percent of the nation directly involved in production agriculture, it would seem necessary that curricula be changed to meet employment needs in other agricultural related sectors. Second, increased academic requirements often compete with the scheduling of vocational courses and the long-standing belief that vocational courses are for the "less able" or "less academically talented" students. Third, the perception that success in life is associated with the acquisition of a college degree. This bias against vocational education may deter students from enrolling and devalues a sound vocational orientation. Finally, many agriculture programs are stereotyped as being comprised of primarily white male students.

Beyond the overall declining enrollment in agricultural education and the FFA, another problem is evident. A nationwide trend in existence since 1959 is that only 75-79 percent of agricultural education students join the FFA. Lass and Burnett (1988) cited the most frequent response of Louisiana agricultural education students for not joining the FFA as not having the time to join and the most frequently cited reason for joining the FFA as the opportunity to learn leadership skills. What factors motivate a student to enroll in agriculture and join the FFA? Students need to identify with a group's goals, ideals, members and philosophies before they feel comfortable enough to become part of that organization (Evans & Donhahue, 1963). Attitudes toward groups are often formed on the basis of information and evaluation which are many times transmitted by secondary or even further removed sources. The reputation of a group will play an important role in determining the support it gets from other groups or individuals. The prestige of a group may be viewed as that part of a group's reputation which reflects its social visibility and ability to influence others. An organization's image and reputation have a direct influence upon an individual's interest in becoming a member of that group (Willerman & Swanson, 1953). Bradford (1984) found that image, defined as curriculum and female stereotype, was a significant factor in a student's decision to enroll in high school home economics.

Does agricultural education have an image problem, and/or are youth not identifying with the FFA? The Committee on Agricultural Education in Secondary Schools (1988) concluded that agricultural education and the FFA are viewed as a white male farm youth organization. Eighteen years ago, Welton (1971) recommended that the FFA launch an intensive nationwide effort to change the image of the FFA from a youth organization primarily for farm youth to one with appeal for all students with career aspirations in agriculture. This recommendation was not officially recognized until the National FFA Convention of 1989.

PURPOSE AND OBJECTIVES

If students are to be recruited into agricultural education programs and join the FFA, there is a need to know which factors motivate enrollment. The problem of declining enrollment in agricultural education and the FFA has been a nationwide concern for a number of years. This study identified, on a nationwide scope, factors that influenced a student's decision to enroll in agricultural education and the FFA. To accomplish the purpose of this study, the following objectives were formulated:

1. Identify and describe the sociodemographic characteristics of eighth and eleventh grade students currently enrolled, anticipating enrollment or not enrolled in agricultural education.
2. Identify various participation and enrollment factors that impact on a student's decision to enroll in agricultural education and join the FFA.

PROCEDURES

This study was conducted using a modified descriptive survey research design. Purposive sampling was used to insure geographic and demographic representation of the FFA population within the continental United States. The following 12 states were chosen to participate in the study: California, Connecticut, Florida, Idaho, Indiana, Iowa, Louisiana, Nebraska, Oregon, Pennsylvania, Texas, and Virginia.

A teacher educator in each state was asked to identify three agricultural education programs geographically distributed across the state and recognized as "good" ag programs in the state. This selection process was used to control any moderating variables that may otherwise influence a student's perception about agricultural education, e.g., less than average programs or programs that are not visible or active. Agricultural teachers from each of the 12 states were asked to identify students to participate in the study.

In each state, 15 eleventh grade students enrolled in agricultural education, 15 eleventh grade students with an identified interest in agriculture but not enrolled in agricultural education, and 15 eighth grade students were interviewed. A total of 540 students were interviewed; however, since we did not limit student participation, several teachers copied additional instruments and 554 (103%) instruments were returned.

INSTRUMENTATION/ANALYSIS OF DATA

Based on a review of literature, three instruments were developed by the researchers to collect data. The instruments collected sociodemographic data and occupational and educational goals for each student. In addition, students responded to a series of statements concerning their decision to enroll in agricultural education and their perception of agricultural education and the FFA. These key statements differed for each group participating. Pilot testing yielded Cronbach's alpha levels of .71 to .99.

Teacher educators in the 12 states identified a graduate student who traveled to the participating schools and collected data. To establish a uniform data collection process, each graduate student was sent a packet of materials containing standard instructions and data collection instruments. The data were analyzed using descriptive and inferential statistics via the Statistical Package for the Social Sciences (SPSS[®]-3.1).

RESULTS

Sociodemographic data for the 554 students who participated in the study were summarized. The results are presented using grade level and enrollment decision (enroll or not enroll) as the primary grouping factors for the students. The data were analyzed using chi-square tests for independence. Data in Table 1 indicate that eighth grade students who plan to enroll in agricultural education in ninth grade are more likely to be white males. One-fourth of these students currently live on farms and one third of their fathers were employed in an agriculturally related occupation. These future enrollees maintain a lower academic average and are more interested in being employed in an agriculturally related career than their non-enrollee peers. Evidence suggests there is a slight relationship between students' enrollment decision and whether they were involved in a junior high agricultural education program/club.

The sociodemographic characteristics inherent to future enrollees also is consistent with those characteristics of eleventh grade students enrolled in agricultural education (Table 1). These current enrollees are more likely to be white males. One of four current enrollees currently live on farms and their parents are more likely to be employed in an agriculturally related occupation. These current enrollees maintain a lower academic average and are more interested in being employed in an agricultural career than their non-enrollee peers.

Perceptions concerning agricultural education and the FFA as they relate to enrollment decisions for the 554 students participating in the study were also summarized. The results are presented using grade level and enrollment decision (enroll or not enroll) as the primary grouping factors for the students. Using factor analysis, four factors were identified that influenced a student's perception about agricultural education and the FFA: (1) future value of agricultural education, (2) image of agricultural education, (3) role of significant others, and (4) school standards and requirements. Factor analysis allowed sociological constructs of group participation to be examined through the analysis of correlations among statements and the cluster of items that emerge as factors.

Table 2 contains factor analysis results for eighth grade students planning to enroll and eleventh grade students currently enrolled in agricultural education. Additional data include item numbers, stems and associated factor loadings for each dimension. Evidence suggests that eighth graders who will enroll feel it will help them prepare for the future and a career in agriculture. They indicated that counselors, parents/guardians, agricultural instructors, and friends played an important role in their decision to enroll in agricultural education. In addition, those who will enroll have an objective and positive image about agricultural education. These students like the class content, and feel agricultural education is for both farm and non-farm kids and can be helpful to both males and females.

A similar trend was evident for eleventh graders currently enrolled in agricultural education. Eleventh graders who are enrolled in agricultural education feel it will help them prepare for the future and a career in agriculture. These students felt that enrolling in agricultural education would make them better citizens, improve their relations with others, and still allow them to meet college entrance requirements. In addition these students felt that parents/guardians, friends, and guidance counselors played an important role in their decision to enroll in agricultural education.

Table 1. Chi-Square Values for Enrollment Decision by Students' Grade Level and Selected Sociodemographic Variables.

Characteristic	Eighth Grade				Eleventh Grade			
	Will Enroll	Will Not Enroll	X ²	V	En-rolled	Not En-rolled	X ²	V
Gender	(N=191)				(N=401)			
Male	69.7	45.8	8.95**	.23	71.8	57.8	8.01**	.15
Female	30.3	54.2			28.2	42.2		
Race	(N=188)				(N=396)			
White	83.8	86.2	.04ns		94.4	89.9	2.15ns	
Nonwhite	16.2	13.8			5.6	10.1		
Academic Average	(N=182)				(N=399)			
B or higher	56.3	80.4	8.66**	.23	51.5	65.3	7.29**	.14
C+ or higher	43.7	19.6			48.5	34.7		
Fathers Occupation	(N=170)				(N=347)			
Non-ag	65.3	80.8	3.43ns		70.1	83.8	8.42**	.16
Ag	34.7	19.2			29.9	16.2		
Mothers Occupation	(N=175)				(N=375)			
Non-ag	62.5	70.9	4.11ns		62.0	76.6	11.95**	.18
Ag	6.7	0.0			10.2	3.2		
Homemaker	30.8	29.1			27.8	20.2		
Desired Occupation	(N=145)				(N=350)			
Non-ag	57.1	83.0	8.28**	.25	44.9	90.2	80.89***	.49
Ag	42.9	17.0			55.1	9.9		
Students Place of Residence	(N=188)				(N=396)			
City	24.6	24.1	14.71**	.28	27.5	23.0	14.50**	.19
Town//suburb	22.3	48.3			28.5	38.8		
Country/non-farm	28.5	15.5			21.0	27.6		
Farm/ranch	24.6	12.1			23.0	10.7		
Junior High Ag	(N=189)							
Yes	32.3	16.9	4.06*	.16				
No	67.7	83.1						

* p < .05
 ** p < .01
 *** p < .001

Table 2. Items that Define Factors That Influence Future/Current Enrollment Decisions in Agricultural Education in Hierarchical Order.

Item	Eighth Grade (N=108)	Loading	Item	Eleventh Grade (N=165)	Loading
Factor 1, Influence of Future Value			Factor 1, Influence of Future Value		
11	Ag Ed will help me prepare for the future	.82	8	Ag Ed will benefit me later in life	.84
8	Ag Ed will benefit me later in life	.81	11	Ag Ed will help me in the future	.82
14	Ag Ed will help prepare me for a career in agriculture	.79	12	Ag Ed will help me improve my relations with others	.72
Factor 2, Role of Significant Others			14	Ag Ed will prepare me for a career	.72
4	Counselor suggested I take Ag Ed	.82	13	Ag Ed will help me become a better citizen	.71
3	Parents/guardian suggested I take Ag Ed	.75	2	I like the classes	.58
1	Friends suggested I take Ag Ed	.69	16	I can still meet college preparatory requirements and still enroll in Ag Ed	.56
5	I like the teachers	.46	Factor 2, Role of Significant Others		
Factor 3, Perceived Image of Ag Ed			3	Parent(s)/guardian suggested I take Ag Ed	.75
2	I like the classes	.75	1	Friends suggested I take Ag Ed	.71
9	Ag Ed is for farm and non farm kids	.60	4	Counselor suggested I take Ag Ed	.53
7	Ag Ed classes can help both males and females	.43			

Table 3 contains factor analysis results for eighth grade students not planning to enroll and eleventh grade students not currently enrolled in agricultural education. Additional data in this table include item numbers, stems and associated factor loadings for each dimension. A different perception is evident from those students not planning on enrolling or not enrolled in agricultural education.

Eighth graders who will not enroll feel that agricultural education would not be of any future value to them and that classes are too production oriented. They felt agricultural education was for young males and people from farms and they did not want to be a part of the FFA. Finally, those eighth graders who will not enroll felt scheduling agricultural education would interfere with high school graduation requirements and conflict with the scheduling of college preparatory classes. In addition, they indicated that counselors did not suggest agricultural education as a possible course option and friends suggested they not enroll in agricultural education. This perception of future non-enrollees is consistent with perceptions of the eleventh grade non-enrollees.

Eleventh graders not enrolled in agricultural education feel it would not be helpful for them, that agricultural education classes are too production oriented, and they do not want to be in the FFA. These students also indicated that agricultural education classes were for young males and for people from farms. Finally, eleventh grade non-enrollees were not encouraged by their counselor or friends to take agricultural education and felt there was not enough emphasis on emerging technology or agricultural research.

Table 3. Items that Define Factors that Influence Future/Current Non-Enrollment Decisions in Agricultural Education in Hierarchical Order.

Item	Eighth Grade (N=53)	Loading	Item	Eleventh Grade (N=166)	Loading
Factor 1, Influence of Future Value			Factor 1, Influence of Future Value		
10	I don't see how it would be helpful to me	.84	6	It wouldn't be helpful to me	.86
5	The classes are too production oriented	.69	9	I don't see how it would be helpful to me	.85
7	It wouldn't be helpful to me	.63	4	The classes are too production oriented	.61
13	I didn't want to join the FFA	.58	12	I didn't want to be in the FFA	.45
Factor 2, Perceived Image of Ag Ed			Factor 2, Perceived Image of Ag Ed		
8	Ag Ed is for farm boys	.82	11	I didn't want to be the only minority in class	.79
12	I didn't want to be the only minority in class	.70	7	Ag Ed is for farm boys	.67
11	Ag Ed is for farm kids	.61	5	Ag Ed is for young males	.59
6	Ag Ed is for young males	.59	10	Ag Ed is for farm kids	.49
Factor 3, Role of Significant Others and School Standards			Factor 3, Role of Significant Others		
4	Ag Ed conflicts with high school graduation requirements	.80	13	There is not enough emphasis on emerging technology/research in Ag Ed	.75
3	I have to take college prep courses	.65	8	I was not encouraged by counselor to take Ag Ed	.74
2	My friends said not to take Ag Ed	.57	2	My friends suggested not to take Ag Ed	.56
9	The counselor did not suggest I take Ag Ed	.47			

CONCLUSIONS

At a cursory glance, this study reflects our suspicions about enrollment trends into agricultural education and the characteristics of the students currently enrolled in our programs. However, this study not only provides the empirical evidence to verify these suspicions it clarifies specific barriers to enrollment as perceived by junior and high school students who are not enrolled in agricultural education programs.

The typical agricultural education enrollee is more likely to be a white male and approximately one-fourth of these enrollees are currently living on a farm. These enrollees are more interested in being employed in an agricultural occupation and the parents of those currently enrolled are more likely to be employed in an agriculturally related occupation. These students who enroll or plan to enroll are more likely to be academically less talented than their respective non-enrolling peers.

Based on the findings of the study, there appears to be a dichotomous but consistent perception about agricultural education and the FFA. Students who are future or current enrollees and future or current non-enrollees tend to be influenced by similar factors.

Evidence from this study highlights three major concerns. First, a student's perceptions about agricultural education are formed and subsequently influence enrollment decisions at the junior high school level. The overriding barrier to enrollment is image, not only the image of agricultural education and the FFA but image of the agricultural profession in general. Too often in the past, enrollment in agricultural education was driven by the agrarian nature of the surrounding community. However, America is changing and the public is losing awareness about the food and fiber system and becoming agriculturally illiterate. "Perception is reality"--if non-enrollees perceive agricultural education and the FFA for white males from farms, see no future value in taking agricultural education, and are influenced by significant others not to enroll in agricultural education, that is what influences their enrollment decision.

Second, the perceived future value of agricultural education strongly influences a student's enrollment decision. Agricultural educators need to "educate" youth about agriculture utilizing a strong organized public relations program before they make this critical enrollment decision. Clouding the decision to enroll in secondary agricultural education is the student's perception of a postsecondary major. In a nationwide study the American College Testing Program (1989) found that the majority of 3359 college-bound juniors and seniors thought most agricultural careers were dependent upon weather conditions, and that salaries of agricultural graduates were lower than those earned by graduates with other majors. Finally, this study also suggests that perceptions about agricultural education and the FFA remain constant once they are formed. Collectively, these concerns suggest a critical need for creative recruitment efforts and programs that address the means of all students at different levels.

The study results provide additional support for concerns previously expressed relative to secondary school agricultural education enrollments. We are not reaching a cross-section of the high school population. Approximately one-tenth of the eleventh graders not enrolled expressed an interest in an agricultural career and one-sixth of future non-enrollees expressed an agricultural career interest. There should be some concern that one of every six eighth graders interested in agricultural careers do not plan to enroll in agricultural education. On a more positive note the study information indicates students who enroll have a career objective congruent with the program, a positive image relative to agricultural education and are influenced by peers and adults. Students not enrolling see little, if any, congruence between their goals and that of agricultural education. In fact, they view agricultural education as being for a select few--white males from farms.

If we are to reach a cross-section of all students, images and perceptions will need to be changed. Agriculture represents a diverse food and fiber production, processing and distribution system of a global nature. Yet, very few people perceive agriculture in this larger perspective. Too many people perceive agriculture to be synonymous with farming. Our mission in agricultural education should include helping people to develop more comprehensive perceptions relative to agriculture. Simultaneously we need to change perceptions of what agricultural education involves. That requires more than cosmetic program changes; a cosmetic change in name alone is simply inadequate. If students, parents, school administrators and the general public are to view agriculture in the more comprehensive arena of a total food and fiber system, local school agricultural education programs must make the necessary substantive changes in content and the way we package and deliver agricultural education. The curriculum content is a key factor influencing students' decision to enroll in agricultural education. Camp (1987) noted that 40.7 percent of the secondary agricultural education teachers were teaching full-time production agriculture and 30 percent were teaching part-time production agriculture with one or more specialized programs. We in the profession know the benefits available to students who enroll in agricultural education and join the FFA. However, we appear to be in the minority. Collectively, from a local to national level, we reassure each other that we are impacting the problem of declining enrollment. But are we?

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FACTORS THAT INFLUENCE SECOND YEAR VOCATIONAL AGRICULTURE STUDENTS' MEMBERSHIP STATUS IN THE FFA

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INTRODUCTION

Vocational programs are designed to prepare students for useful employment (Public Law 347). If students are to be prepared for the world of work, then developing the "total" individual is imperative (Ricketts & Newcomb, 1984). There is little doubt that technical competencies are needed for employment, but developing a well-rounded individual that can function in a working environment is also important. To develop such an individual, leadership, citizenship, cooperation, and personal development skills must be taught to students.

Vocational agriculture is a vocational program offered in secondary school systems. It is composed of three integral parts, which are classroom instruction, supervised occupational experiences and the Future Farmers of America (FFA). Classroom instruction provides opportunities for students to study and discuss problems in agriculture and agribusiness. Technical competencies are learned in the classroom and then applied in the student's supervised occupational experience program. "Supervised occupational experience programs in agriculture consist of all the practical agriculture activities of educational value conducted by students outside class or on school-released time for which systematic instruction and supervision are provided by their teachers, parents, employers, or others" (Phipps, 1980). Such programs may include the production of agricultural commodities, improvement practices for the home or farming operation, or placement in an agricultural related business. The Future Farmers of America is designed to develop leadership, citizenship, cooperation, and personal development skills. Members learn these skills by participating in various activities like public speaking contests, community service projects, state and national conventions and etc.

"FFA is the only co-curricular activity in a public school system that is considered an intracurricular, rather than an extracurricular activity" (Vaughn, 1977, p. 183). Public Law 740 legally defined the Future Farmers of America (FFA) as an integral part of secondary vocational agriculture programs, granted a federal charter, and provided federal funds for and assistance with the FFA.

If FFA is an important component in the development of a well-rounded individual, then why do all FFA chapters not have 100% of vocational agriculture students enrolled as members? Enrollment figures have been on the decline on a national level. FFA enrollment reached a peak in fiscal year 1976-77 with 509,735 members. Since then, the number has decreased to 430,375 members in 1985-86 (National FFA Organization, 1987). One would hardly think that the intended outcomes of the FFA (leadership, citizenship, cooperation, etc.) are less important today than in the past. Therefore, it would seem that involvement in the FFA is just as important if not more so today than in the past.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine those factors that influence second year vocational agriculture students to join or not to join the Future Farmers of America (FFA). The following specific objectives were formulated:

- (1) To determine the attitude of second year vocational agriculture students toward vocational agriculture, the FFA, the instructor, and the school.
- (2) To determine the perceptions of second year vocational agriculture students who are FFA members regarding why they chose to join the organization.
- (3) To determine the perceptions of second year vocational agriculture students who are not FFA members regarding why they chose not to join.
- (4) To determine the demographic characteristics of students enrolled in second year vocational agriculture classes.
- (5) To describe the relationship between selected demographic characteristics and membership status of second year vocational agriculture students.

PROCEDURES

Population and Sample

The target population of the study was students enrolled in second year vocational agriculture classes in Louisiana public high schools. A cluster sampling procedure was used to randomly select twenty vocational agriculture programs. An additional ten programs were randomly selected to serve as alternates. All students enrolled in vocational agriculture II within each randomly selected program made up the sample of participants.

Instrumentation

The data were collected using the descriptive method of research. A questionnaire, developed by Paulson (1981), was selected for use in the study. The questionnaire was divided into four sections. Sections one and two were completed by all students and collected demographic information and students' attitudes toward vocational agriculture, FFA, the instructor and the school. Section three was completed by those students who were members of the FFA to determine why they chose to join. Section four was completed by non-members to determine why they chose not to join the FFA. Sections 2-4 utilized a 5 point Likert-type scale ranging from Strongly Disagree to Strongly Agree.

Data Collection

Instructors of the selected vocational agriculture programs were contacted and asked to participate and at the same time, indicate the number of students enrolled in vocational agriculture II classes within their program. For those teachers indicating they did not offer agriculture II or that they were not willing to participate, replacements were chosen from the list of randomly selected alternate programs. One program was replaced by the first alternate program because the teacher declined to participate in the study.

The instrument was distributed by mail to the selected sample. Teachers were asked to administer the questionnaires to their vocational agriculture II class(es). Follow-up telephone calls were made to the participants who had not returned the instruments within two weeks of the original mailing. Responses were received from all twenty programs in the sample (100% response) with 299 students participating.

RESULTS

The first objective was to determine the attitude of second year vocational agriculture students toward components of the vocational agriculture program. Section II of the questionnaire was designed to collect data concerning the attitudes of all the participants toward vocational agriculture, FFA, the instructor, and the school. Students were asked to indicate their level of agreement with 27 statements. The respondents tended to agree most with the following statements: "My vo ag teacher wants us to learn" (M = 4.34) and "My vo ag teacher knows what he/she is teaching" (M = 4.33). Of the items focusing on the FFA, those which received the highest ratings included: "I think the FFA is an interesting organization" (M = 4.14) and "My vo ag teacher wants all students to be members of the FFA" (M = 4.09). Those statements with which students least agreed were as follows: "I took vo ag because it was required" (M = 1.65) and "The counselor put me in vo ag" (M = 1.59). Mean ratings of the 27 items are presented in Table 1.

Table 1

Mean & Standard Deviation of Student Attitudes Toward Vocational Agriculture, FFA, the Instructor, and the School

Statement	Mean ^a	Std. Dev.
My vo ag teacher wants us to learn	4.34	1.00
My vo ag teacher knows what he/she is teaching	4.33	1.04
My vo ag teacher is fair in grading	4.14	1.00
My vo ag teacher is concerned that students learn	4.14	1.00
I think the FFA is an interesting organization	4.14	.93
My vo ag teacher wants all students to be FFA members	4.09	1.04
I think the FFA will help me in future life	4.07	1.09
This vo ag class will help me in later life	4.07	1.04
I like my vo ag teacher	4.06	1.08
My vo ag teacher is clear in class presentations	4.04	.97

(table continues)

Table 1 (continued)

	Mean ^a	Std. Dev.
My vo ag teacher makes the class interesting	3.94	1.27
My vo ag teacher teaches in different ways	3.90	.98
My vo ag teacher maintains good order during class	3.83	1.21
My vo ag teacher is well organized	3.78	1.15
My vo ag teacher values student's opinions	3.69	1.05
My vo ag teacher treats all students the same	3.62	1.24
If I had a school problem, my vo ag teacher would help me	3.57	1.16
I took vo ag because I wanted to join FFA	3.57	1.24
If I had a personal problem, my vo ag teacher would help	3.45	1.22
I took vo ag because I wanted to work in an ag. occup.	3.38	1.27
I like school	2.80	1.41
I think the image of FFA should change	2.65	1.28
I think FFA dues are too high	2.60	1.29
I took this vo ag because my friends are taking vo ag	2.49	1.30
I took vo ag because I heard it was easy	2.43	1.34
I took vo ag because it was required	1.65	.93
The counselor put me in vo ag	1.59	1.00

^a Rating Scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

Section III, completed only by members of the FFA, focused on why those students chose to join the FFA. These data are presented in Table 2. Items with which students tended to agree most were: "I joined the FFA because it provides an opportunity to learn leadership" (M = 4.01); "I joined the FFA because I wanted to participate in the activities" (M = 3.99); and "I joined FFA because it teaches a lot about ag" (M = 3.90). Students tended to disagree with the following: "I joined the FFA because it was required" (M = 1.78) and "I joined FFA because my brother(s) and/or sister(s) were/are in the FFA" (M = 1.89).

Data was collected in Section IV from students that were not members of the FFA. These students were asked to respond to seventeen items designed to obtain their perceptions on why they chose not to join the FFA. Nonmembers tended to respond undecided or disagree with all seventeen items. However, those items which received the highest ratings included: "I did not have time to join the

Table 2

Mean & Standard Deviation of FFA Members' Perceptions of Why They Chose to Join the FFA

Statement	Mean ^a	Std. Dev.
I joined the FFA to learn leadership	4.01	.96
I joined the FFA to participate in the activities	3.99	.94
I joined FFA because it teaches me a lot about ag	3.90	1.04
I joined the FFA because my friends joined the FFA	2.53	1.25
I joined the FFA because my parents wanted me to	1.98	1.02
I joined the FFA because my brother(s) and/or sister(s) were/are in FFA	1.89	1.15
I joined FFA because it was required	1.78	.98

^a Rating Scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

FFA" (Mean =2.87); "I would never join the FFA" (Mean = 2.70); "I do not like to participate in any club or organization" (Mean = 2.66); and "I am involved in too many other activities to join the FFA" (Mean 2.66). Students were undecided on each of these items. Items with which students disagreed most included: "I did not join because my parents would not let me join the FFA" (Mean = 1.65); "I would join the FFA if my parents would let me" (Mean = 1.82); and "I would join the FFA if the FFA advisor was more fun to be with" (Mean 1.88) (see Table 3).

A summary of the demographic data (section 1 of the instrument) revealed that 276 (93.0%) of the students were males and 22 (7.0%) were female. Of the 299 participants, 265 (88.6%) were FFA members and 34 (11.4%) were non-members.

Students were asked to indicate whether or not they participated in the following school organizations and/or activities: band, dramatics, school paper, science club, class officers, yearbook, sports, and FFA. As observed in Table 4, 88 percent of the respondents participated in the FFA and 48 percent participated in school related sports. The number of yes responses to participation in school organizations and/or activities were summed to yield a school activity score. These scores ranged from 0 to 5 with a mean value of 1.61. Almost half (142 or 47.7%) of the respondents reported that they participated in only 1 organization or activity; and 38.6% (115) participated in 2. In addition, 8 percent (24) participated in three, and 2.7% (8) reported participation in each of the categories 0 and 4. Only 1 (0.3%) reported participation in 5 activities.

Students were also asked to indicate participation in the following nonschool organizations: church youth organizations, boy scouts, girl scouts, and 4-H. Table 5 indicates number and percentage of students participating in each

Table 3

Mean & Standard Deviation of Nonmembers' Perceptions of Why They Chose Not to Join the FFA

Statement	Mean ^a	Std. Dev.
I did not have time to join the FFA	2.87	1.48
I would never join the FFA	2.70	1.61
I do not like to participate in any club or organization	2.66	1.34
I am involved in too many other activities to join FFA	2.66	1.56
I did not join because I think the FFA is only for people that want to farm	2.59	1.41
I would join if my friends would	2.33	1.32
I did not join the FFA because I do not like the image	2.31	1.28
I did not join the FFA because it costs too much	2.28	1.46
I did not join because I do not like the vo ag teacher	2.13	1.36
I did not join the FFA because I work after school	2.06	1.24
I would join the FFA if we had some other advisor	2.06	1.23
I did not join the FFA because groups scare me	2.03	1.18
I did not join because I did not want to be in this class in the first place	2.03	1.28
I would join the FFA if the advisor liked me	2.00	1.18
I would join the FFA if the advisor was more fun to be with	1.88	1.25
I would join the FFA if my parents would let me	1.82	1.14
I did not join because my parents would not let me	1.65	.98

^a Rate Scale: 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree

organization. Only 37 percent of the students are involved in church youth organizations and only 13 percent participate in 4-H activities. The number of yes responses to participation in nonschool organizations were summed to yield a nonschool activity score. These scores ranged from 0 to 3 with a mean value of .597. Over one-half of the respondents (158 or 53.0%) indicated that they did not participate in any nonschool organizations. In addition, 107 (35.9%)

Table 4

Participation of Students in School Organizations/Activities

Organization/Activity	Y	N
FFA	263 (88.3%)	35 (11.7%)
Sports	143 (48.0%)	155 (52.0%)
Others	30 (10.1%)	268 (89.9%)
Class Officer	21 (7.0%)	277 (93.0%)
Yearbook	8 (2.7%)	290 (97.3%)
Band	7 (2.3%)	291 (97.7%)
Science Club	4 (1.3%)	294 (98.7%)
School Paper	3 (1.0%)	295 (99.0%)
Dramatics	2 (0.7%)	296 (99.3%)

Note. These frequencies do not sum to N (298) since respondents were asked to indicate all that apply.

participated in 1; 28 (9.4%) participated in 2; and 5 (1.7%) participated in 3 nonschool organizations.

Table 5

Participation of Students in Nonschool Organizations

Nonschool Organization	Y	N
Church Youth Groups	111 (37.2%)	187 (62.8%)
4-H	38 (12.8%)	260 (87.2%)
Others	21 (7.0%)	277 (93.0%)
Boy Scouts	7 (2.3%)	291 (97.7%)
Girl Scouts	1 (0.3%)	297 (99.7%)

Note. These frequencies do not sum to N (298) since participants were asked to indicate all that apply.

The students were asked what they planned to do upon graduation from high school. The largest response category was college with 123 (43.6%) of the respondents. In addition, data revealed that 17 percent expressed a desire to work in one of the following agricultural areas: farming or ranching (24 or 8.5%), forestry or natural resources (7 or 2.5%), or other agricultural related occupations (17 or 6.0%). Almost one-fourth (66 or 23.4%) reported plans to enter the military, and 45 (16.0%) indicated some other future plans.

Objective 5 sought to describe the association between selected demographic characteristics and membership status. The Chi-Square test of independence was used to determine if the variables gender and membership status were independent. The results of this test, $\chi^2 (1) = 0.495$, $p = .48$, indicated that the variables were independent. The Chi-Square test of independence was also used to determine

if the variables future plans and membership status were independent. Results of the test revealed that future plans was also independent of membership status ($\chi^2(3) = 2.041, p = 0.56$).

The relationship between membership status and school activity score was then determined using the Pearson Product Moment correlation coefficient. The correlation between the variables was $r = -.02$ ($p = .79$) indicating a nonsignificant relationship. However, when the relationship between the nonschool activity score and FFA membership status was calculated, a coefficient of $r = .16$ ($p = .03$) revealed a significant positive relationship.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions were drawn:

1. Most vocational agriculture students in Louisiana are members of the FFA.
2. Vo ag students' attitudes toward the FFA are generally very positive.
3. No reasons were identified with which nonmembers agreed regarding why they did not join the FFA.
4. Students who are members of the FFA do not tend to be more or less active in other school organizations and activities than do nonmembers.
5. Students who are members of the FFA tend to be more active in nonschool organizations and activities than do nonmembers.

Based on the findings and conclusions of the study, the following recommendation was formulated.

1. Although this study revealed that 88.6% of the students were FFA members, 11.4% were not. The benefits of membership need to be emphasized to vocational agriculture students not enrolled in the FFA.

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Job Satisfaction of Vocational Agriculture Teachers and Their Perceptions Toward the Agricultural Education Teaching Profession

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INTRODUCTION

For a number of years, one of the concerns confronting vocational agriculture on the national level has been a shortage of qualified teachers. Mattox (1974) stated that effective programs of vocational agriculture are dependent upon an adequate supply of qualified teachers and that teacher educators for many years have been trying to solve the teacher shortage problem with little success. He also reported that a large percentage of prospective teachers, once trained, enter other professions or leave teaching after a short period of time.

According to Gruenberg (1976), there appeared to be a relationship between occupational change or turnover and job satisfaction. When vocational agriculture teachers leave the profession, some degree of job dissatisfaction is implied. One of the consequences of job turnover among teachers, as reported by Becker (1969), was the cost to society for the continual training of far more teachers than would appear to be required. Muncrief (1979) stated that since teacher education is a costly investment, if graduates do not remain in the profession, it would seem beneficial to take steps to increase the tenure of teachers who are both successful and satisfied with teaching.

Employee job satisfaction and factors such as productivity, performance, absenteeism, and job turnover have been investigated in several studies. Porter and Steers (1973), Baum and Youngblood (1975), and Bartol (1979) reported that there was a low, but consistently positive correlation between job dissatisfaction and several factors, one of which was job turnover. Carrell (1976) discussed several reasons for examining job satisfaction, including the determination of sources of, and the relationship between, satisfaction and dissatisfaction. He suggested that the relationships of satisfaction to training, absenteeism, and turnover were important.

In North Carolina during the years 1980 through 1985, 64% of the vocational agriculture teachers that left the profession did so for a change of occupations. There was a lack of precise information as to the existing degree of job satisfaction among the vocational agriculture teachers. Additionally, there was a lack of information concerning the various factors and/or variables that affected the job satisfaction of North Carolina vocational agriculture teachers and the corresponding relationships which existed between selected variables and vocational agriculture teacher job satisfaction. In view of the importance of qualified teachers as a prerequisite for the success of vocational agriculture programs and the apparent relationship between job dissatisfaction and teacher turnover, there appeared to be a need for investigating the factors which contribute to vocational agriculture teacher job satisfaction in North Carolina. It was anticipated that findings of this study would provide information concerning job satisfaction for vocational agriculture teachers in North Carolina

and would prove helpful to the state leadership of agricultural education in planning occupational enrichment activities for vocational agriculture teachers.

PURPOSE AND OBJECTIVES

The purposes of this study were to determine the level of job satisfaction of the vocational agriculture teachers in North Carolina and to determine whether a relationship existed between their level of job satisfaction and their perceptions toward various portions of the teaching profession. Specifically, the study answered the following research questions:

1. What are the intrinsic, extrinsic, and general job satisfaction levels of North Carolina vocational agriculture teachers?
2. Is there a relationship between the general job satisfaction level of North Carolina vocational agriculture teachers, as measured by the Minnesota Satisfaction Questionnaire, and their perceptions toward their working environment?
3. Is there a relationship between the general job satisfaction level of North Carolina vocational agriculture teachers, as measured by the Minnesota Satisfaction Questionnaire, and their perceptions toward the financial support they receive?
4. Is there a relationship between the general job satisfaction level of North Carolina vocational agriculture teachers, as measured by the Minnesota Satisfaction Questionnaire, and the perceptions toward the degree of professional acceptance they receive?

PROCEDURES

The study was conducted as a descriptive study which incorporated aspects of correlational research methodology. The population for this study consisted of the vocational agriculture teachers employed in North Carolina during the 1985-1986 school year ($N = 375$) as identified in the 1985-1986 North Carolina Vocational Agriculture Teacher Directory. This information was verified for accuracy by the Chief Consultant for Vocational Agriculture Education in North Carolina. The 1985-1986 North Carolina Vocational Agriculture Teacher Directory served as the frame for the population.

The formula suggested by Hinkle and Oliver (1985) was used to determine the required sample size ($n = 246$). Based on the considerations related to the required sample size, traditional return rates of similar studies in North Carolina of approximately 77%, and the need for oversampling as discussed by Hinkle, Oliver, and Hinkle (1985), the research sample was increased to 320 teachers who were randomly selected from the population.

The Minnesota Satisfaction Questionnaire (short form) was selected, based on recommendations reported by Vroom (1964) and Robinson, Athanasiou, and Head (1969), as part I of the research questionnaire used for data collection in this study because it facilitated the determination of a general job satisfaction score, an intrinsic job satisfaction score, and an extrinsic job satisfaction score. The Minnesota Satisfaction Questionnaire was developed by Weiss, Dawis, England and Lofquist (1967) and represented the result of research conducted on the Work Adjustment Project in studies conducted at the University of Minnesota. The theory underlying the basis for the Work Adjustment Project stated that "... work adjustment

depends on how well an individual's abilities correspond to the reinforcers available in the work environment" (Weiss et al. 1967, p. v).

The Minnesota Satisfaction Questionnaire (short-form) included 20 items. Each item represented either an intrinsic facet or an extrinsic facet of the job situation. Each item presented the respondent with five response alternatives which ranged from not satisfied to extremely satisfied. The general satisfaction scale involved the use of all 20 items with a potential scores ranging from 20 to 100. The intrinsic scale involved 12 items with potential scores from 12 to 60. The extrinsic scale involved 6 items with potential score ranges from 6 to 30.

In scoring the Minnesota Satisfaction Questionnaire for general job satisfaction, when percentile scores were used, Weiss et al. (1967) reported that a score of 50 or better indicated satisfaction. A percentile score of 75 or higher indicated a high degree of satisfaction, and a percentile score of 25 represented a low level of satisfaction. It was reported that percentile scores which ranged from 26 to 74 indicated average satisfaction. For teachers, Weiss, et al. (1967) reported Hoyt reliability coefficients for individual items ranging from .74 to .91, with a general satisfaction Hoyt reliability coefficient of .87. For the intrinsic satisfaction scale, internal consistency coefficients ranged from .77 to .82; and for the items on the extrinsic satisfaction scale, coefficients ranged from .84 to .91. The authors also reported that the median Hoyt reliability coefficients were .86 for intrinsic satisfaction, .80 for extrinsic satisfaction, and .90 for general satisfaction. These internal consistency coefficients suggested that the instrument had good reliability. Regarding the stability of the instrument, the authors reported a test-retest correlation of general satisfaction scale scores which yielded coefficients of .89 over a one-week period and .70 for a one-year interval.

Part II of the questionnaire consisted of situational items utilizing a five point, Likert type scale, patterned after the Minnesota Satisfaction Questionnaire (short form). Part II of the instrument was used to gather data which concerned teacher perceptions of 18 factors related to job satisfaction which were identified in the literature. Part II of the instrument was field tested using 10 randomly selected teachers who were not selected for the research sample. A Cronbach Alpha coefficient of .88 was calculated for this part of the instrument. Part III of the questionnaire used in the study, consisted of a personal questionnaire. Responses to eight items enabled the gathering of demographic information related to the sample. Prior to the actual field test of the questionnaire, parts II and III of the questionnaire were examined and critiqued by a panel of experts to determine the readability and suitability of the questionnaire and to establish content validity of the instrument. The suggestions obtained from the panel were incorporated into the final questionnaire design and wording.

A survey packet was mailed to each teacher in the research sample. The packet included a cover letter which explained the purpose of the study, provided assurance of anonymity, and requested the teacher's participation; the questionnaire to be completed; and a stamped, return addressed envelope. The teachers were requested to complete and return the questionnaire within three weeks. At the end of the three week period, 220 questionnaires had been received which constituted a 68.75% response rate. At the end of the three week period, a second mailing was sent to individuals who had not responded to the initial mailing. As a result of the second mailing, 40 additional questionnaires were received which constituted a 40% response rate for the second mailing.

Miller and Smith (1983) reported that late respondents were often similar to

nonrespondents and if no statistical differences were found, then it is permissible to generalize the findings to describe the sample. In order to determine if there were any differences between the early and late respondent groups for the variables in the study, t-tests were computed for the two respondent groups for the intrinsic, extrinsic and general job satisfaction scores. At the .05 level, there were no significant differences for general job satisfaction, intrinsic, or extrinsic scores for the two groups. Since there were no differences between the early and late respondents in the study, the data were assumed to be representative of the sample and they were combined for analysis. The total number of returned, usable questionnaires totaled 260, or 81.25% of the 320 teachers in the sample.

ANALYSIS OF DATA

Analysis of data in this study utilized descriptive statistics, which included measures of central tendency, frequency distributions, percentages, and measures of variance (standard deviations). Pearson product-moment correlations were used to determine relationships between the independent variables and the dependent variable. An alpha level of .01 was established a priori. The dependent variable in the study was the job satisfaction of North Carolina vocational agriculture teachers who were employed during the 1985-1986 school year. The independent variables examined in the study were the vocational agriculture teachers' perceptions of their: (a) working environment, (b) financial support, and (c) professional acceptance.

Because statistical significance for correlation coefficients do not always imply practical significance, analysis of the data also involved the use of practical descriptors for the interpretation of correlation coefficients. Hinkle et al. (1979) reported that one commonly used set of descriptors for the interpretation of correlation coefficients was as follows: (a) .90 to 1.00 equals a very high correlation; (b) .70 to .90 equals a high correlation; (c) .50 to .70 equals a moderate correlation; (d) .30 to .50 equals a low correlation; and (e) .00 to .30 equals little if any correlation.

RESULTS

The Study Population

For the purpose of describing the population, the vocational agriculture teachers responded to eight demographic items on the questionnaire. The average number of years of teaching experience for the teachers in the sample was 13.64 ($SD = 9.4$). Female vocational agriculture teachers made up 6.5% of the sample, while 93.5% of the teachers were male. The racial composition of the vocational agriculture teachers was 13.5% non-white and 86.5% white. Of the respondents, 81.1% were enrolled in vocational agriculture while in high school whereas 18.9% were not. Among the respondents, 81.9% reported that the majority of their vocational agriculture students came from rural backgrounds. The respondents reported that their school student enrollments ranged from a low of 125 students to a high of 2,500 students.

Job Satisfaction Levels

The initial research question involved the determination of the intrinsic, extrinsic, and general job satisfaction levels of North Carolina vocational agriculture teachers. The general job satisfaction scores for the vocational agriculture teachers in the sample ranged

from 38 to 97. The general job satisfaction mean score was 75.86 ($SD = 9.78$), based on the raw data for the study sample. For comparative purposes, this mean score approximated the 45 th percentile for the "Employed Non-Disabled" group in the Minnesota Satisfaction Questionnaire manual and represented a moderate level of satisfaction. For respondents, the minimum intrinsic job satisfaction score was 18 and the maximum intrinsic score was 60. The mean intrinsic score for these teachers was 49.08 with a standard deviation of 5.53 which represented an average level of satisfaction. For respondents, the minimum extrinsic job satisfaction score was 7 and the maximum extrinsic score was 30. The mean extrinsic score was 19.23 ($SD = 4.31$) and represented an average level of satisfaction.

Table 1 presents the mean satisfaction scores for the factors as expressed by the North Carolina vocational agriculture teachers. The four factors examined under the independent variable, professional acceptance, had the highest levels of satisfaction by the North Carolina vocational agriculture teachers. With the exceptions of having to perform noninstructional duties and academic ability of enrolled students, financially related factors had the lowest mean scores of the factors examined in the study.

Job satisfaction scores below 2.75 were interpreted as representing dissatisfaction among the vocational agriculture teachers. Items with mean scores above 3.25 were interpreted as representing satisfaction for those items. Scores between 2.75 and 3.25 indicated neither satisfaction nor dissatisfaction.

North Carolina vocational agriculture teachers appeared to be satisfied with the following 11 factors: (a) professional acceptance by other vocational agriculture teachers in the State, (b) professional acceptance by members of the North Carolina Vocational Agriculture Teachers Association, (c) professional acceptance by school faculty, (d) type of teaching department, (e) professional acceptance by school principal, (f) community support, (g) number of different class preparations required daily, (h) administrative support by the principal, (i) vocational agriculture facilities, (j) discipline of the enrolled students, and (k) having to work long hours and having evening responsibilities. The mean scores shown in Table 1 indicated that North Carolina vocational agriculture teachers were neither satisfied nor dissatisfied with the following factors: (a) adequacy of financial support for instructional materials, (b) adequacy of financial support for consumable instructional materials, (c) adequacy of financial support for travel reimbursement for the teacher, (d) salary, and (e) having to perform noninstructional duties. North Carolina vocational agriculture teachers appeared to be dissatisfied with (a) academic ability of the enrolled students, and (b) adequacy of financial support for local salary supplement for the teacher.

The relationship between overall job satisfaction and the teachers' perception of their working environment was examined using nine factors related to the working environment of teachers identified in the literature (See Table 1). Statistically significant relationships ($p < .01$) were found to exist between the overall job satisfaction level, as measured by the Minnesota Satisfaction Questionnaire, of the vocational agricultural teachers and their perceived level of satisfaction toward their working environment. An interpretation of the correlation coefficients using the Hinkle and Oliver conventions indicated that for eight of the factors in this category, only a low correlation existed. Only one of the nine factors examined, "administrative support," exhibited a moderate correlation.

The relationship between the overall job satisfaction level of North Carolina vocational agriculture teachers, as measured by the Minnesota Satisfaction Questionnaire, and their perceptions toward the financial support they received was determined by examining five

factors (See Table 1). The perceptions of the teachers toward all five factors were found to have positively significantly relationships ($p < .01$) with the levels of overall job satisfaction determined by the Minnesota Satisfaction Questionnaire. However, the practical significance of the relationships indicated that little if any correlation existed between the level of overall

Table 1

Satisfaction Levels of Research Factors As Expressed By North Carolina Vocational Agriculture Teachers and Correlation Values With Minnesota Satisfaction Questionnaire Scores

Independent variable/factor	Perceived satisfaction level		
	M ^a	SD	r ^b
Working environment:			
Type of department (single teacher versus multiple teacher)	3.96	.79	.44*
Level of community support	3.71	.86	.48*
Number of different class preparations required daily	3.66	.94	.35*
Administrative support	3.65	1.09	.64*
Adequacy of vocational agriculture facilities	3.45	1.16	.39*
Discipline of enrolled students	3.31	1.07	.43*
Long hours and evening responsibilities	3.26	.94	.43*
Noninstructional duties	2.76	1.23	.44*
Academic ability of enrolled students	2.69	1.03	.43*
Financial support:			
For instructional materials	3.00	1.06	.35*
For consumable instructional materials	2.94	1.16	.28*
For travel reimbursement	2.92	1.22	.22*
Salary	2.89	1.13	.46*
Salary supplement	2.34	1.19	.27*
Professional acceptance:			
By other vo-ag teachers	4.06	.59	.31*
By members of NCVATA	4.05	.63	.31*
By school faculty	3.99	.66	.44*
By school principal	3.89	.86	.63*

Notes: Means established with a scale where 1 = very dissatisfied, 2 = dissatisfied, 3 = undecided, 4 = satisfied, 5 = very satisfied

^an = 260.

^bPearson product-moment correlations calculated between general satisfaction scores as determined by the Minnesota Satisfaction Questionnaire and perceived levels of satisfaction expressed by teachers for the factors supporting the independent variables.

*($p < .01$).

job satisfaction and the teachers' perceived level of satisfaction with the following three factors: (a) financial support for consumable instructional materials, (b) financial support for travel reimbursement, and (c) salary supplement. The teachers' perceived levels of satisfaction with the remaining two factors, "financial support for instructional materials" and "salary" were found to have a low correlation with the job satisfaction scores.

The relationship between the overall job satisfaction level of North Carolina vocational agriculture teachers, as measured by the Minnesota Satisfaction Questionnaire, and their perceptions toward the professional acceptance they received was determined by examining four factors related to professional acceptance (See Table 1). The relationships between the teachers' perceptions of their level of satisfaction with these factors and their Minnesota Satisfaction Questionnaire scores were statistically significant ($p < .01$). However, practical interpretation of the data in Table 1 indicated that only a low correlation existed between the level of overall job satisfaction and the teachers' perceived levels of satisfaction with professional acceptance (a) by other vocational agriculture teachers, (b) by members of the professional organization North Carolina Vocational Agriculture Teachers Association, and (c) by the school faculty. A moderate correlation was found between the teachers' perceived level of satisfaction with professional acceptance by the school principal and their overall job satisfaction.

Conclusions and Recommendations

Vocational agriculture teachers in North Carolina have a moderate level of general job satisfaction, and average levels of intrinsic and extrinsic job satisfaction. However, it appeared that North Carolina vocational agriculture teachers were characterized as having higher intrinsic job satisfaction as opposed to extrinsic job satisfaction. Since only average to moderate levels of job satisfaction were determined, efforts need to be made to provide inservice training activities to increase the various levels of job satisfaction of North Carolina vocational agriculture teachers.

North Carolina vocational agriculture teachers are satisfied with a majority of the factors which comprise their working environment. However, since lower levels of satisfaction were reported for the factors involving noninstructional duties and the academic ability of students enrolled in vocational agriculture, attention should be focused in these areas. This might best be done by attempting to provide both preservice and inservice programs for vocational agriculture teachers to help them work better with the less academically and discipline problem oriented students, and by encouraging school administrators to reduce the quantity of noninstructional assignments and activities which require evening hours for vocational agriculture teachers.

North Carolina vocational agriculture teachers tend to be more dissatisfied with the financial support they receive than with their working environment and professional acceptance. In order to improve the perceptions vocational agriculture teachers have toward the financial support they receive, effort should be made to increase both local and state dollars for instructional material, consumable instructional materials, travel reimbursements, and local salary supplements. Efforts should also continue to encourage the state legislature to take steps to raise salaries for teachers in the state.

Basically, vocational agriculture teachers in North Carolina are satisfied with the level of professional acceptance they receive from other vocational agriculture teachers, members of the North Carolina Vocational Agriculture Teachers Association, other school faculty members, and their principals. However, since there appears to be a moderate practical relationship between the level of job satisfaction of vocational agriculture teachers and their relationships with their principals, efforts should be made on the part of vocational agriculture teachers to improve the rapport with and support of their local principals.

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The Relationship Between Critical Thinking Ability
and Level of Cognitive Performance of Selected
Vocational Agriculture Students

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INTRODUCTION

Several studies in the past have measured and explained cognitive abilities (Newcomb & Trefz, 1987; Cano, 1988; Pickford, 1988) and explained critical thinking abilities (Rollins, Miller, & Kahler, 1988; Arter & Salmon, 1987; Ennis, 1985). Past research has indicated that most students show little evidence of using critical thinking skills when solving problems; in fact, most students continue to operate in a concrete operational manner (Day, 1981).

Furthermore, researchers have identified cognitive deficiencies that characterize poor problem solvers, with a passive approach to learning as an underlying causal factor (Chance, 1981; Lochhead, 1981). Fuerstein (1980) and Jensen (1969, 1973) believed that intellectual capacities were not entirely determined by heredity and that cognitive development could be positively influenced perhaps through the problem solving approach to teaching.

The problem solving approach has been one of the cornerstones of vocational agriculture instruction. Although vocational agriculture instructors are familiar with and may use the problem solving technique, are agriculture students actually capable of critically thinking through problem situations? Furthermore, do agricultural students think at higher levels of cognition to solve problems? Likewise, does a relationship exist between cognitive abilities and critical thinking abilities of vocational agriculture students?

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the extent to which students in vocational agriculture programs were performing at the various levels of cognition utilizing Bloom's Taxonomy. In addition, this study sought to determine the extent to which vocational agriculture students think critically. Furthermore, this study sought to determine the relationship between level of cognitive performance and critical thinking ability.

The following research questions were investigated:

1. What was the cognitive level of performance of vocational agriculture students as measured by the Developing Cognitive Abilities Test (DCAT)?
2. What was the critical thinking ability of vocational agriculture students as measured by the Watson-Glaser Critical Thinking Appraisal?

3. What was the relationship between the Developing Cognitive Abilities Test and the Watson-Glaser Critical Thinking Appraisal scores of the vocational agriculture students?

PROCEDURES

POPULATION AND SAMPLE

The population for this study was the students enrolled in vocational agriculture classes in Ohio during 1988-89. Ten schools were purposefully selected for this study based upon predetermined criteria. All students enrolled in vocational agriculture at the selected schools (n=385) took the Developing Cognitive Abilities Test and the Watson-Glaser Critical Thinking Test.

DESIGN OF STUDY

This was a descriptive-correlational study.

INSTRUMENTATION

The Developing Cognitive Abilities Test and the Watson-Glaser Critical Thinking Appraisal were administered to the vocational agriculture students enrolled in vocational agriculture programs at the selected schools. Validity and reliability have been established for both standardized tests which were utilized to collect the data by their respective authors.

DATA COLLECTION

The Developing Cognitive Abilities Test and the Watson-Glaser Critical Thinking Test were mailed to each vocational agriculture instructor at each selected school for administration. Each respective test was accompanied by specific instructions for test administration. In addition, the teachers were asked to complete a test administration form for each test to ensure compliance to directions.

ANALYSIS OF DATA

Descriptive statistics were used to determine student cognitive level of performance and critical thinking abilities. Canonical correlation was used to describe the relationship between the Developing Cognitive Abilities Test scores and the Watson-Glaser Critical Thinking Appraisal scores.

RESULTS

DEVELOPING COGNITIVE ABILITIES SUBTESTS BY GRADE LEVEL

The Developing Cognitive Abilities Test subtests are based on the levels of Bloom's taxonomy, which are hierarchical in nature. The Basic abilities subtest includes items classified as knowledge/comprehension, the Application abilities subtest includes items classified as application, and the Critical Thinking abilities subtests is composed of items at the analysis/synthesis levels.

All students scored highest on the Basic abilities subtest, lower on the Application abilities, and lowest on the Critical Thinking abilities (Table 1). Tenth grade students scored higher than eleventh grade students on Basic abilities, Application abilities and overall (DCAT total). Ninth grade students scored consistently lower than all other students on all subtests (Table 1) and DCAT total. In addition, a linear trend was found on the Critical Thinking abilities subtest (Table 1). As students advanced by grade level, their scores on this subtest also tended to increase.

TABLE 1

MEANS OF STUDENTS FOR COGNITIVE SUBTESTS OF THE DEVELOPING
COGNITIVE ABILITIES TEST BY GRADE LEVEL

Grade Level	n	Level of Cognitive Subtest			
		Basic	Application	Critical Thinking	DCAT Total
9	96	17.17	14.88	11.94	43.81
10	114	18.23	16.35	12.91	47.45
11	88	17.32	16.31	13.09	46.81
12	86	18.14	17.01	13.58	48.71
Total	384	17.73	16.12	12.86	46.67

WATSON-GLASER CRITICAL THINKING APPRAISAL SUBTESTS BY GRADE LEVEL

The mean scores of students across grade levels for subtests of the Watson-Glaser Critical Thinking Appraisal are depicted on Table 2. Unlike the subtests from the Developing Cognitive Abilities Test, these subtests are not hierarchical. Students at all grade levels scored lowest on the Inference subtest with mean scores ranging from 5.69 to 6.34 based on a maximum score of 16 (Table 2). In addition, twelfth grade students consistently scored higher than students at the other grade levels (Table 2).

RELATIONSHIP BETWEEN THE DEVELOPING COGNITIVE ABILITIES TEST
AND THE WATSON-GLASER CRITICAL THINKING APPRAISAL

The relationship between student performance on the Developing Cognitive Abilities Test and student performance on the Watson-Glaser Critical Thinking Appraisal was calculated utilizing the canonical correlation procedure. Table 3 presents the correlation matrix depicting the relationship between the independent (predictor) and dependent (criterion) variables.

TABLE 2
MEANS OF STUDENTS FOR SUBTESTS OF THE WATSON-GLASER
CRITICAL THINKING APPRAISAL BY GRADE LEVEL

Grade Level	n	Critical Thinking Subtests					Total
		Infer.	Assump.	Deduct.	Interp.	Argue.	
9	96	5.71	9.02	8.95	8.89	9.14	41.73
10	114	5.69	9.44	8.68	9.33	9.22	42.27
11	88	5.75	9.61	8.75	8.77	8.75	41.66
12	86	6.34	10.07	9.14	8.60	9.65	42.35

Note: Maximum score = 16 per subtest; Total maximum score = 30.

The intercorrelations among the criterion variable set revealed substantial positive correlations (Davis, 1971). Among the predictor variable set, low to moderate positive intercorrelations (Davis, 1971) were found. The correlations between the individual predictor and individual criterion variables resulted in positive coefficients. The coefficients ranged from low to moderate (Davis, 1971).

The null hypothesis tested was that all squared canonical correlations ($R_c^2(s)$) equaled zero. Conducting a test of significance for the canonical functions was accomplished by utilizing Wilks Lambda. This test was significant at $p = .01$ (Table 4). The null hypothesis was rejected, indicating that the first squared canonical correlation ($R_c^2(1)$) was statistically significant.

STANDARDIZED CANONICAL AND STRUCTURE COEFFICIENTS

An examination of standardized canonical weights for covariates (Table 5) revealed that for the independent variables the betas ranged from $-.450$ to $-.161$ with inference and interpretation being relatively most important. For the dependent variables the betas ranged from $-.506$ to $-.227$ with critical thinking being relatively most important (Table 5).

The magnitude of the structure coefficients were interpreted following guidelines established by Chuatong (1987). The interpretations were: $.25$ or lower, Low; $.25$ to $.64$, Moderate; $.65$ or higher, High. On the criterion variable set, Critical Thinking abilities ($-.919$) loaded highest on Canonical Variate 1, with Basic abilities ($-.879$) and Application abilities ($-.843$) also found to be high (Table 5). Of the predictor variable set, Inference ($-.750$) and Interpretation ($-.735$) loaded highest on Canonical Variate 1 (Table 5).

CONCLUSIONS AND/OR RECOMMENDATIONS

CONCLUSIONS

1. There was a significant relationship between student mean scores on the DCAT and student mean scores on the Watson-Glaser test.

TABLE 3

Relationship* Between the Developing Cognitive Abilities Test
and the Watson-Glaser Critical Thinking Appraisal (n=385)

	Criterion Variable Set (Percent Items Correct) Student Level of Performance on the Developing Cognitive Abilities Test			Predictor Variable Set (Percent Items Correct) Student Level of Performance on the Watson-Glaser Critical Thinking Appraisal				
	B	A	C	I	RA	D	In	EA
<u>Criterion Variable Set</u>								
Basic Abilities	1.000							
Application Abilities	.685	1.000						
Critical Thinking Abilities	.656	.686	1.000					
<u>Predictor Variable Set</u>								
Inference	.379	.335	.387	1.000				
Recognition of Assumptions	.266	.215	.267	.271	1.000			
Deduction	.219	.234	.269	.237	.136	1.000		
Interpretation	.375	.362	.362	.332	.133	.354	1.000	
Evaluation of Arguments	.255	.298	.305	.207	.177	.177	.338	1.000

Note: B=Basic; A=Application; C=Critical Thinking; I=Inference; RA=Recognition of Assumptions; D=Deduction; In=Interpretation; EA=Evaluation of Arguments.

*Pearson's Product Moment Correlation Coefficients

TABLE 4
CANONICAL CORRELATION ANALYSIS

Function	Eigen Value	Canonical Correlation	Squared Canonical Correlation	F Test	P
1	.459	.561	.315	10.81	.010
2	.017	.128	.016	1.04	.404
3	.005	.073	.005	0.67	.569

Wilks Lambda = .671, F = 10.81 (df 15,384), p = .010

2. All intercorrelations were low to substantial and positive, indicating that as scores on one test increased, a corresponding increase was evident on the other test.
3. Based on findings from previous studies (Newcomb and Trefz, 1986; Cano, 1988; Pickford, 1988), students were performing at comparable levels to other agriculture students.
4. The students performed at higher percentages at the various levels of cognition as compared to the findings in previous studies (Gall, 1970; Ryan, 1973).

RECOMMENDATIONS

1. Students of vocational agriculture should be challenged to develop stronger cognitive abilities and critical thinking abilities at higher levels through the instruction they receive.
2. Further research needs to be conducted to determine the extent to which problem solving instruction, which has been the cornerstone of vocational agriculture, contributes to the cognitive ability and critical thinking ability development of the students.
3. Further research should be conducted to determine if the results of this study are generalizable for the population of vocational agriculture students.
4. Further research should be conducted in cognition and critical thinking in other vocational areas.
5. Further research should be conducted which compares the performance of students of vocational agriculture to students in the general student body.

TABLE 5

Summary of Canonical Correlation Analysis

Variable	Canonical Variate 1		Canonical Variate 2		Canonical Variate 3	
	b	s	b	s	b	s
<u>Criterion Variable Set</u>						
Basic Abilities	-.391	-.879	1.364	.419	.375	.229
Application Abilities	-.227	-.843	-1.061	-.353	1.068	.406
Critical Thinking Abilities	-.506	-.919	-.331	-.164	-1.339	-.359
<u>Predictor Variable Set</u>						
Inference	-.450	-.750	.304	.255	-.337	-.247
Recognition of Assumptions	-.271	-.514	.437	.356	-.330	-.371
Deductions	-.161	-.491	-.403	-.298	-.600	-.384
Interpretations	-.409	-.735	.321	.052	.948	.591
Evaluation of Arguments	-.259	-.554	-.886	-.711	.036	.121
Redundancy		.170		.011		.003
		$R_c^2(1) = .315$		$R_c^2(2) = .016$		$R_c^2(3) = .005$

Note: b=Standardized Canonical Coefficient; s=Structure Coefficient

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RELATIONSHIPS BETWEEN JOB AND MARITAL SATISFACTION OF
SECONDARY AGRICULTURE TEACHERS AND THEIR SPOUSES

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INTRODUCTION

Research concerning work-family relationships have focused largely on the differentiation of the two roles. When job satisfaction and work performance are addressed, most writers tend to deal with variables other than and separate from family and personal life. However, it has been shown that the amount of time that a secondary agriculture teacher spends in professional activities, especially after regular school day hours, has a direct effect on the spouse's perception of problems concerning his/her teaching spouse (Coughlin, 1988; Straquadine, 1985). Studies dealing with teacher turnover have noted that the personal and family life of the secondary agriculture teacher can influence actions concerning the professional life. Teachers have indicated that "spouse reaction to job obligation" (Cooper and Nelson, 1981) and "wife not happy with secondary agriculture profession" (Mattox, 1974) are among the reasons they leave the profession.

Studies with specific populations or wide cross-sections of occupations across America have shown positive relationships between job satisfaction and marital satisfaction. Anderson (1984) used the data base of 3,692 respondents from the 1987 Quality of Life in America Survey to find that job satisfaction can be a predictor of marital satisfaction. A direct relationship was found between wives' perceived job satisfaction and husbands' marital satisfaction in a dual career couples study by Albers (1981). And, in a study concerning medical residents' wives (Alexander, 1985) a primary problem in the marital relationship was the small amount of time the husband could spend in family activities. These relationships between job satisfaction and spouse marital satisfaction have not been thoroughly studied within other occupations or within the secondary agriculture teaching profession. Cooper and Nelson (1981, p. 18) suggested that "Research should be conducted regarding the effects of spouse and family obligations as they are related to continuation or level of activity in vo-ag teaching." This study was designed to investigate relationships between job and marital satisfaction of secondary agriculture teachers and their spouses.

PURPOSE AND OBJECTIVES

The primary purpose of this study was to investigate relationships between the job and marital satisfaction of secondary agriculture teachers and their spouses. The antecedents of interest were: (a) marital satisfaction of the teacher; (b) marital satisfaction of the spouse; and (c)

demographic variables (age, years married, level of education, years teaching, income, and presence of children). The consequence was the job satisfaction of secondary agriculture teachers.

The specific objectives of the study included: (1) describe the antecedents and consequences among secondary agriculture teachers in the National Vocational Agriculture Teachers Association (NVATA) Northeast Region of the United States; (2) determine the nature and strength of relationships between the antecedents and between selected antecedents and the consequence; and (3) determine the best predictor(s) of the consequence, job satisfaction.

PROCEDURES

The target population of the study was the married vocational agriculture teachers and their spouses in the 13 states comprising the Northeast Region designated by the NVATA. Due to difficulty in identifying married teachers, the population for sampling was the teachers listed in each state's most current directory of vocational agriculture teachers (N=1,541). A sample size of 212 was determined using Cochran's proportional formula (1977). With an expected 75% response rate and 212 questionnaires needed for a statistically representative sample, 283 teachers were randomly selected to receive questionnaires. A cover letter and questionnaire was sent to teachers and upon return of the survey instruments, only data provided by married teachers were analyzed.

In order to study the relationships between the vocational agriculture teacher's and his/her spouse's marital satisfaction and the job satisfaction of the teacher, two previously developed and validated questionnaires that would facilitate accomplishing the objectives of this study were selected. Based on a review of previous research using these instruments and subsequent confirmation by a panel of experts consisting of selected faculty in the College of Agriculture and Forestry the content measured by the two instruments selected, the Purdue Teacher Opinionnaire and the Dyadic Adjustment Scale, was judged to be valid and suitable to the population being studied. The Cronbach's reliability coefficients of .96 obtained for the Purdue Teacher Opinionnaire and .94 for the Dyadic Adjustment Scale were consistent with reliability coefficients of the scales noted in previous studies.

The Purdue Teacher Opinionnaire and two copies of the Dyadic Adjustment Scale (one for the teacher, the other for the spouse) and a request for additional demographic data, were assembled into a booklet and mailed with a cover letter to the selected teachers. The original mailing, a follow-up letter, and a final mailing which included another questionnaire resulted in return of 152 questionnaires, of which 113 (53% response rate) were from teachers who were married. To test for nonresponse bias, the χ^2 test analysis of early and late respondents (Miller & Smith, 1983) was utilized. Since no statistically significant differences ($p < .05$) were found between the two groups and using the logic that late respondents are most like non-respondents, results of the study were generalized to the target population of married secondary agriculture teachers and their spouses of the Northeast Region of the NVATA.

RESULTS

Ninety two percent of the teachers responding were males (Table 1). Thirty one percent reported earning less than \$25,000 per year, while almost 42% earned over \$30,000 per year. A majority of the teachers held 11 or 12 month employment contracts. Almost 56% of the teachers held at least a Masters degree, while slightly less than 50 percent of the spouses held at least a Bachelors degree. Most of the teachers lived in a residence with a rural location. Almost 57% of the spouses were employed full time outside the home. Seventy seven percent of the couples reported having children living at home.

Table 1

Frequencies for Selected Characteristics of Respondents

Characteristic	Frequency	Percent
Gender		
Male	104	92.0
Female	9	8.0
Salary		
< \$25,000/year	35	31.0
\$25,000 to \$30,000/year	31	27.4
> \$30,000/year	47	41.6
Teacher's Level of Education		
Bachelors	19	16.8
Bachelors +15	31	27.4
Masters	31	27.4
Masters +15	11	9.7
Higher than Masters +15	21	18.6
Spouse's Level of Education		
High School	57	50.4
Bachelors	38	33.6
Masters	12	10.3
Higher than Masters	6	5.3
Teaching Contract Length		
9 months	11	9.7
10 months	27	23.9
11 months	20	17.7
12 months	55	48.7

Table 1 (continued)

Characteristic	Frequency	Percent
Location of Residence		
Rural - farm	59	52.2
Rural - non-farm	26	23.0
Town	10	8.8
City	14	12.8
No response	4	3.5
Spouse Employment		
Full time (40 hrs./wk.)	64	56.6
Less than full time	23	20.4
Not employed	26	23.0
Regularly Attend Church or Religious Activities with Spouse		
Yes	77	68.1
No	36	31.9
Children Living at Home		
Yes	87	77.0
No	26	23.0

There was no difference between the marital satisfaction scores of teachers and those of the spouses (Table 2). The marital satisfaction scores of the couples in this study (113) were consistent with those found in validation studies for the instrument. The mean job satisfaction score of 272 out of a possible 400 indicates that the teachers were fairly satisfied with their jobs.

Table 2

Means for Selected Characteristics of Respondents

Characteristic	Mean	Std. Dev.
Years Teaching	15.5	8.9
Teachers in Department	2.6	1.7
Students in School	936.8	744.4
Hours of Work per Week	45.7	8.7
Teacher's Age	40.3	9.9
Spouse's Age	38.1	9.2

Table 2 (continued)

Characteristic	Mean	Std. Dev.
Years Married	15.3	10.3
Job Satisfaction Total Score	272.3 *	30.2
Teacher's Marital Satisfaction Score	113.8 **	16.0
Spouse's Marital Satisfaction Score	113.8 **	15.5

* Total possible score = 400

** Total possible score = 151

Pearson Product-Moment Correlation Coefficients (Table 3) were computed for the relationships between the total job satisfaction score of the secondary agriculture teachers and the marital satisfaction score of the teachers, the marital satisfaction score of the spouses and the demographic data. The following are the antecedents and their corresponding correlation coefficients with teacher job satisfaction.

Table 3

Relationships Between Job Satisfaction and Antecedents

Antecedent	Correlation Coefficient	Antecedent	Correlation Coefficient
Years Teaching	$r = .32$	Spouse's Age	$r = .30$
Teaching Contract Length	$r = .16$	Children at Home	$r = -.16$
Income Level of < \$ 25,000/year	$r = -.40$	Teacher Education Level of B.S.	$r = -.15$
Income Level of \$ 25 - 30,000/year	$r = .07$	Teacher Education Level of B.S. +15	$r = -.04$
Income Level of > \$ 30,000/year	$r = .31$	Teacher Education Level of M.S.	$r = -.12$
Teacher's Marital Satisfaction	$r = .25$	Teacher Education Level of M.S. +15	$r = .15$
Years Married	$r = .29$	Teacher Education Level of >M.S. +15	$r = .21$

Table 3 (continued)

Antecedent	Correlation Coefficient	Antecedent	Correlation Coefficient
Spouse Education Level of H.S.	$r = .14$	Teacher's Age	$r = .32$
Spouse Education Level of B.S.	$r = -.27$	Spouse's Marital Satisfaction	$r = .28$
Spouse Education Level of M.S.	$r = -.05$	Number of Teachers in Department	$r = .01$
Spouse Education Level of M.S. +	$r = -.09$	Number of Students in high school	$r = .04$
Number of Hours Teacher Works/Wk	$r = -.11$	Number of Hours Spouse Works/Wk	$r = .10$
Spouse Employment	$r = .07$	Gender	$r = -.27$
Rural Farm Residence	$r = -.27$	Rural Non-farm Residence	$r = .02$
Town Residence	$r = .14$	City Residence	$r = .04$
Joint Involvement in Religious Activities	$r = -.11$		

To determine the best predictor(s) of the consequence, a stepwise multiple regression technique was employed. Some antecedents were dummy coded when necessary to allow their entry into the stepwise analysis. Antecedents were entered into the stepwise regression equation according to the strength of relationship with the consequence. A significance level of .05 was chosen for entry into and removal from the model regardless of the strength or direction of the relationship.

Data in Table 4 indicate the set of best predictors for teacher job satisfaction, in order of significance were, the income category of earning less than \$25,000 per year, the spouse's marital satisfaction and the presence of children living at home. The total proportion of variance accounted for was 24.95% ($R^2 = .2495$). The best overall predictor was the earning of less than \$25,000 per year.

Table 4

Stepwise Multiple Regression of Teacher Job Satisfaction

Antecedent	Correlation Coefficient r	Multiple R	2 R	2 R Increment	F
Income Level of < \$ 25,000/yr.	-.40	.4052	.1642	.1642	18.67
Spouse's Marital Satisfaction	.28	.4629	.2143	.0501	12.82
Children Living at Home	-.16	.4995	.2495	.0352	10.31

p < .05

CONCLUSIONS AND RECOMMENDATIONS

Secondary agriculture teachers in the Northeast Region of NVATA had moderate levels of job satisfaction. Marital satisfaction of the teachers and spouses was high.

Findings of this study indicate that the job satisfaction of secondary agriculture teachers is not entirely dependent upon job related factors. Family attributes, particularly the marital satisfaction of the spouse, make a contribution to the job satisfaction expressed by teachers. Presence of children at home also factored in the job satisfaction of the teachers in this study. The demands on secondary agriculture teachers and the conflict between parental and professional responsibilities may account for the negative relationship between the presence of children in the family and job satisfaction.

Relationships between the antecedents and job satisfaction suggest that teachers, spouses and administrators need to be aware of the role family factors seem to have on job satisfaction.

Teacher salaries of less than \$25,000 per year showed a negative relationship with job satisfaction. Perhaps young teachers struggling to make ends meet perceive salary as influencing job satisfaction more than do older teachers at higher levels of the salary schedule.

Further research should be conducted on other antecedents which may predict a higher proportion of the variance in job satisfaction. In addition, comparisons of the job satisfaction of married and single secondary agriculture teachers and of the job satisfaction of secondary agriculture teachers with other teachers and administrators should be initiated.

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PERFORMANCE OF OHIO VOCATIONAL AGRICULTURE TEACHERS ON THE
NATIONAL TEACHER EXAM CORE BATTERY TESTS

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INTRODUCTION

In recent years, the traditional methods of teacher certification have been seen as inadequate by the American public. National polls have repeatedly shown that the great majority of the American public supports mandatory teacher competency testing for certification purposes. For example, the 1986 Gallup poll of the public's attitude toward the public schools showed that 85% of the public favored requiring experienced teachers to pass a statesmanship test of basic competence in their subject areas. Three previous education polls showed across-the-board support for teacher competency testing (Gallup & Clark, 1987). In commenting on the wave of the teacher competency testing movement, Isler (1985) observes that "competency testing of prospective teachers seems to be taking the country by storm. It is being viewed both as a quality assurance measure for the general public and as a way of demonstrating that teaching is indeed a profession since other professions already require successful completion of an examination prior to entry" (p. 27).

Testing teachers prior to certification is now the law in 44 states. By 1990, virtually every state will require tests of basic skills, subject matter knowledge, and/or professional knowledge before a teacher can receive a standard license to teach (Darling-Hammond, 1986). But how important to the learning environment is a knowledgeable teacher?

Moore (1984) found that knowledge of the subject is usually the first qualification brought up when people discuss the requirement for great teachers with the rationale being "one cannot teach what one does not know" (p. 18). Shulman (1986) stated that the ultimate test of understanding rests on the ability to transform one's knowledge into teaching. Citron (1985) believed that the first step to excellence in teaching is to improve the qualifications of those who enter the profession.

In Ohio, vocational education teacher candidates enter teaching by two different methods of teacher preparation. One method of agricultural teacher certification is the four-year college teacher education program culminating in a Bachelor of Science degree and a four-year provisional teaching certificate (labeled regular teachers). This regular type of teacher education program includes course work in general education, technical subject matter, and professional knowledge (pedagogy).

The other method of agricultural teacher certification in Ohio is called the industry-teacher program. These candidates are individuals who are deemed to be competent in the subject matter to be taught based on the length of service in an area to be taught. These teachers may also have a bachelor's degree; however, this degree is not in agricultural education. After securing a teaching position, these teachers receive temporary certification and must

complete three years of inservice course work and supervision before being granted a provisional teaching certificate. This three-year program of course work and supervision, added to occupational competence from experience, is considered by the Division of Teacher Education and Certification to be equal to the four-year college-level teacher education program in Ohio.

In 1990, Ohio will begin to implement the Teacher Education and Certification Standard (State Board of Education, 1985), effective July 1, 1987, which requires teacher candidates to complete a teacher competency examination prior to certification. Limited evidence is available regarding the current level of competence of agricultural education teachers in Ohio. Knowledge of teacher performance on competency tests would allow teacher educators as well as state education personnel to determine types of inservice education that may be required for agricultural education teacher candidates who obtain a low score on the teacher competency examination prior to the implementation of the State Teacher Competency Exam.

PURPOSE AND OBJECTIVES

This study was primarily concerned with communication skills, general knowledge competence and professional knowledge competence of beginning regular and industry-prepared vocational agriculture teachers in Ohio as measured by the Core Battery Tests of the National Teacher Exam (NTE). Four objectives were stated to guided this study:

1. To describe beginning vocational agriculture teachers on the following characteristics: age, gender, high school grade point average, length of industry-related experience, type of school currently teaching in, amount of education received, type of teacher education received, and scores achieved on the communication skills, general knowledge, and professional knowledge portions of the NTE Core Battery tests.
2. To compare the vocational agriculture teacher's knowledge competence in communication skills, general knowledge, and professional knowledge with the following characteristics: age, gender, high school grade point average, length of industry-related experience, type of school currently teaching in, and amount of education received.
3. To compare regular and industry-prepared vocational agriculture teachers on the same characteristics.
4. To compare vocational agriculture teachers on the method of teacher preparation received and their performance on the NTE Core Battery tests.

PROCEDURES

This study was part of a larger study conducted by the principal investigator that included teachers in all vocational areas. The study was designed to be ex post facto type of research since the major independent variable, type of teacher preparation program, had already occurred.

Two instruments were utilized to collect data for this study. The first instrument was the core battery tests of communication skills, general

knowledge, and professional knowledge found in A Guide to the NTE Core Battery Tests: Communication Skills, General Knowledge, Professional Knowledge (Educational Testing Service, 1984). The second instrument used to gather data about the independent variables of gender, age, high school grade point average, length of industry-related experience and amount of education received was designed by the researcher. Data concerning type of school currently teaching in and method of teacher preparation received were collected from records in the Department of Agricultural Education at The Ohio State University.

The target population for this study was all beginning regularly-prepared vocational agriculture teachers in Ohio (N=15) and all beginning industry-prepared vocational agriculture teachers in Ohio (N=10) for the 1988-89 school year. However, due to financial constraints, an accessible population was identified for the industry-prepared teachers. This accessible population included all beginning vocational agriculture teachers in the Central and Southwest Ohio Vocational Education Personnel Development Center Regions prepared via the industry teacher route (N=6). Those regions were selected because they are administered by The Ohio State University. Demographic data were collected from the industry-prepared teachers of the other region to determine if the accessible population was representative of the target population. No significant differences were found.

ANALYSIS OF DATA

The independent variables were described in terms of frequencies, percentages, measures of central tendency and measures of variability. The dependent variables were measured in terms of the scale test score which is determined from the product of the raw scores and a weighting factor compared to a conversion table in the NTE guide. The independent variables were grouped prior to further analysis. T-test and Fisher's Exact test were used to determine differences between the various sets of subgroups.

RESULTS

The typical beginning vocational agriculture teacher could be described as 34 years old, male, has over 15 years of industry-related experience, had a high school grade point average of 3.35, and has received some form of postsecondary degree. The vocational agriculture teachers were evenly split as to the type of school (high school or career center) where currently teaching. The average competence scores for agriculture teachers were as follows: communication skills-652; general knowledge-656; professional knowledge-650. This compares with the national averages for this exam of 659, 659, 656 for communication skills, general knowledge, and professional knowledge respectively.

In the area of communication skills competence, several significant differences in the teacher's background characteristics were found. Teachers in the 22-32 age group (n=6) scored significantly higher ($p<.05$) in communication skills competence than the 33-59 age group (n=6). Teachers with an "A" average high school grade point average (3.30-4.00; n=4) scored significantly higher ($p<.05$) in communication skills competence than the "B" average group (2.70-3.29; n=5). Teachers with fewer years of industry related experience (10 years or less; n=6) scored significantly higher ($p<.05$) in

communication skills competence than the teachers with greater amounts of industry-related experience (n=6). Teachers with some form of postsecondary degree (n=7) scored significantly higher ($p<.05$) in communication skills competence than those teachers whose highest educational degree being a high school diploma (n=5) (see Table 1).

Comparison of the general knowledge competence scores with the teacher's background characteristics also revealed significant differences. Teachers in the 22-32 age group (n=6) scored significantly higher ($p<.05$) in general knowledge competence than the 33-59 age group (n=6). Teachers with some form of postsecondary education (n=7) scored significantly higher ($p<.05$) in general knowledge competence than those teachers whose highest educational degree is a high school diploma (n=5) (see Table 2).

Comparison of the professional knowledge competence scores with the teacher's background characteristics also revealed significant differences. Teachers in the 22-32 age group (n=6) scored significantly higher ($p<.05$) in professional knowledge competence than the 33-59 age group (n=6). Teachers with some form of postsecondary education (n=7) scored significantly higher ($p<.05$) in professional knowledge competence than those teachers whose highest educational degree is a high school diploma (n=5) (see Table 3).

Table 4 displays the results of the comparison of the major independent variable, method of teacher preparation received, with the teacher's background characteristics. Industry-prepared agriculture teachers were significantly older (Mean=41.33; $p<.05$) than regularly prepared agriculture teachers (Mean=27.67). Regularly-prepared agriculture teachers were found only in high school settings while industry-prepared agriculture teachers were teaching in career centers. Regularly-prepared agriculture teachers all have received at least their bachelor's degree while only one industry-prepared agriculture teacher had a higher educational degree than a high school diploma.

In comparing the method of teacher preparation received with the dependent variables of communication skills, general knowledge, and professional knowledge competence, no significant differences were found ($p<.05$).

CONCLUSIONS AND/OR RECOMMENDATIONS

Based on the results of this study, the following conclusions were reached concerning the research objectives. Vocational agriculture teachers in Ohio are near the national average on communication skills, general knowledge, and professional knowledge competence. Younger vocational agriculture teachers in Ohio tend to achieve higher communication skills, general knowledge, and professional knowledge competence scores than older vocational agriculture teachers. Vocational agriculture teachers in Ohio with some form of educational degree beyond their high school diploma tend to achieve higher communication skills, general knowledge, and professional knowledge competence scores than vocational agriculture teachers who have only a high school diploma. Method of teacher preparation received does not influence communication skills, general knowledge, or professional knowledge competence scores among vocational agriculture teachers in Ohio.

The following recommendations are made. School superintendents, state supervisors, and teacher educators should recruit vocational agriculture teachers who possess more than a high school education since these teachers tend to demonstrate higher levels of knowledge competence as measured by the NTE exams. Inservice programming designed to improve the communication skills, general knowledge, and professional knowledge competence of beginning vocational agriculture teachers should be offered to increase their knowledge competence level. As states continue to examine and/or adopt reform measure in teacher education, the study of the knowledge competence of regular and industry-prepared vocational agriculture teachers should be continued. Every effort must be made to eliminate extraneous variables from the study. Industry-prepared teachers should be retested at the completion of their preparation program to determine if their knowledge competence is similar to regularly-prepared vocational agriculture teachers. A high level of association was found among communication skills, general knowledge, and professional knowledge scores. Further research should be conducted to discriminate among teachers on the basis of one of these three tests. Research should be conducted with the vocational agriculture teachers in this study to determine the relationship between the teachers' knowledge competence scores and their effectiveness as a teacher.

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Table 1. Summary of Comparisons Between Communication Skills Competence Scores by Background Characteristics

Characteristic	Mean Score	T-Test Value	df	p
<u>Age</u>				
22-32	664.17			
33-59	639.50	3.42	10	.007*
<u>Gender</u>				
Male	646.63			
Female	662.25	-1.21	3.70	.297
<u>High School Grade Point Average</u>				
2.70 - 3.29	648.20			
3.30 - 4.00	670.00	-3.23	6.94	.015*
<u>Years of Industry-related Experience</u>				
5-10	661.67			
11 or more	645.53	2.28	10	.045*
<u>Type of School Teaching In</u>				
High School	659.17			
Career Center	644.50	1.54	10	.156
<u>Amount of Education Received</u>				
High School	637.60			
Postsecondary	662.00	-3.25	10	.009*

Table 2 Summary of Comparisons Between General Knowledge Competence Scores by Background Characteristics

Characteristic	Mean Score	T-Test Value	df	p
<u>Age</u>				
22-32	667.83			
33-59	643.67	3.67	10	.004*
<u>Gender</u>				
Male	652.50			
Female	662.25	-0.81	4.27	.459
<u>High School Grade Point Average</u>				
2.70 - 3.29	655.20			
3.30 - 4.00	669.75	-2.11	6.62	.075
<u>Years of Industry-related Experience</u>				
5-10	664.33			
11 or more	647.17	2.02	10	.071
<u>Type of School Teaching In</u>				
High School	659.00			
Career Center	640.67	1.83	10	.098
<u>Amount of Education Received</u>				
High School	640.40			
Postsecondary	666.71	-4.07	10	.001*

Table 3 Summary of Comparisons Between Professional Knowledge Competence Scores by Background Characteristics

Characteristic	Mean Score	T-Test Value	df	p
<u>Age</u>				
22-32	663.33			
33-59	636.32	3.44	10	.006*
<u>Gender</u>				
Male	643.50			
Female	662.50	-1.46	4.02	.217
<u>High School Grade Point Average</u>				
2.70 - 3.29	647.00			
3.30 - 4.00	668.00	-2.25	6.26	.064
<u>Years of Industry-related Experience</u>				
5-10	659.83			
11 or more	639.83	2.06	10	.067
<u>Type of School Teaching In</u>				
High School	659.00			
Career Center	640.67	1.83	10	.098
<u>Amount of Education Received</u>				
High School	632.60			
Postsecondary	662.14	-4.14	10	.002*

Table 4 Summary of Comparisons Between Method of Teacher Preparation Received by Background Characteristics

Variable	Regular	Industry	Test Statistic	p
<u>Age</u>				
Mean	27.67	41.33	t = -2.58	.027*
<u>Gender</u>				
Male	4	4	Fisher's Exact Test	1.000
Female	2	2		
<u>High School Grade Point Average</u>				
Mean	3.318	3.400	t = -0.26	.816
<u>Years of Industry-related Experience</u>				
Mean	10.33	21.00	t = -1.69	.123
<u>Type of School Teaching In</u>				
High School	6	0	Fisher's Exact Test	.002*
Career Center	0	6		
<u>Amount of Education Received</u>				
High School	0	5	Fisher's Exact Test	.008*
Postsecondary	6	1		